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. Technical Q&A



Question & Answer Corner

We welcome any opinions, and questions to this Q & A Corner. Please contact us.

Q: We have blue-green algae problems in hottest and coldest seasons when turbidity become up to 200 NTU at the highest. What should we deal with removing these blue-green algae from raw water? (From Mr. R. C. C, Zambia)

A1: Answered by Mr. Shinichi Sasaki (A former officer of Yokohama Waterworks Bureau).



Mr. Sasaki

1) To solve the problem, Mr. Sasaki asked following questions and got these answers from Mr. R.C. C (R) as follows.

(1): Are the algae species blooming and their problems in hot season and cold season same?

R: In hot seasons, algae grain like green algae (* No answer for the algae in cold seasons).

(2): Do you know the name of algae? For example, *Mycrocystis*, *Anabaena* or *Oscillatoria*.

R: I don't know. Please check the pictures. (See Attachment 1)

(3): Do the algae have odor?

R: Yes.

(4): Do the algae make filters clogging?

R: No, they go through filter.

(5): Do the algae make increase of turbidity in treated water?

R: Yes

(6): Do you have problems anything else?

R: Increases of pH and chlorine demand.

2) Answered by Mr. Sasaki 1

I suspect the algae may cause coagulation inhibition in sedimentation basin. In case the algae are the green algae, they causes algal odor. In case they have musty odor, the algae may be *Anabaena* or *Oscillatoria* genus. Judging from the picture's bubble and color, it may not be *Mycrocystis* genus.

3) Mr. Sasaki asked following additional questions.

(7): What kind of odor is there? Musty odor or algal odor?

R: Algal odor.

(8): Do you have pH control equipment?

R: No.

(9): What kind of coagulant do you use?

R: Aluminum sulfate (Alum).

(10): Do you have data of pH and turbidity?

R: Yes (See Attachment 2).

(11): Do you have microscopes?

R: (No answer)

4) Answered by Sasaki 2

Mechanism of coagulation disorders cause by algae bloom

In general, pH becomes higher when algae are growing in raw water because algae absorb dissolved carbon dioxide by assimilation.

On the other hand, aluminum sulfate works well in pH range from 5 to 7 for coagulation. In case pH value is more than 8, it means alkaline condition, aluminum sulfate don't work effectively.

So, when the algae makes raw water pH high, aluminum sulfate doesn't work well.

Countermeasures

(1) pH control (Target pH is approximately 7).

Measure 1: To make pH low, put aluminum sulfate of 2 times volume as usual into raw water. Aluminum sulfate makes pH low by consuming alkalinity and hydroxyl ion.

Measure 2: To make pH low, put sulfuric acid or carbon dioxide into raw water. In case the sulfuric acid injection facility is not available, polyethylene tank with tap can be used as a temporary facility. Drop liquid sulfuric acid into receiving well or raw water channel.

(2) Pre-chlorine

Measure 1: Put chlorine into receiving well to kill algae. The concentration of pre-chlorine is determined by chlorine demand but normally it's ranged from 0.5 to 1.0 mg/L while the residual chlorine will not remain in clarified water after sedimentation basin. Contact time; it is effective in

only less than 5 minutes. Dead algae can be easily removed by coagulation/sedimentation process.

Measure 2: When algae having odor substances come into the receiving well and you cannot use activated carbon, you must stop pre-chlorine and add more coagulant than usual to prevent odor problems. That is because killed algae release odor substance into water and odor concentration become high as a result.

Please try them in order from the ones which you can do. Each chemical amount can be determined by jar-test.

If you have any more question, don't hesitate to ask me. I will make a specific counter measures according to your actual situation.

When something changes on the treatment process after you carried out some measures, please contact me.

A2: Answered by Mr. Shingo Hayashi, Osaka Water Supply Authority



Mr. Hayashi

I suspect following phenomenon occurs in dam lake.

- 1) Formation of thermocline (thermal stratification) in the lake
- 2) Elution of nutrient salts at the bottom of lake
- 3) Development of Eutrophication
- 4) Blooming of algae

In addition to remove algae directly, I recommend you control algae growth at dam lake. The circulation-aeration method for lake water is effective way. It can be the fundamental solution though the effect would not show up in a short time. For example, the circulation by aeration equipment was installed in dam lake at Hitokura Dam, Hyogo prefecture, Japan by Japan Water Agency. Two years after installation, it was found out to be effective and the *Mycrocystis* genus decreased.

There are many cases all over Japan and there

are several kinds of equipment for circulation by aeration.

*** Reference**

*1: "Handbook for Preventive Water Treatment against Biological Troubles" published by Japan Water Works Association. *Chapter VII Countermeasures against Biological Problems (WaQuAC-NET translated it into English and has all responsibility in the translation).

*2: There are lots of information on internet about

equipment for circulation by aeration.

https://en.wikipedia.org/wiki/Water_aeration

Explanation by EPA (United States Environmental Protection Agency)

<http://www.epa.state.il.us/water/conservation/lake-notes/aeration-circulation/aeration-circulation.pdf>

Pictures

<https://www.google.co.jp/search?q=lake+aeration+systems&biw=1138&bih=494&tbm=isch&tbo=u&source=univ&dpr=1.2>

Attachment 1: Pictures of algae blooming in WTP (07-25 Sep 2016)



Attachment 2: Raw Water Quality

RAW WATER QUALITY FOR AUGUST, SEPTEMBER AND OCTOBER 2016.

Date	AUGUST 2016		SEPTEMBER 2016		OCTOBER 2016	
	pH	Turbidity(NTU)	pH	Turbidity(NTU)	pH	Turbidity(NTU)
1	6.6	34.35	6.9	42.41	7.4	32.25
2	6.9	21.04	7.2	40.75	7.7	28.65
3	6.9	24.56	6.8	39.33	6.9	25.00
4	6.9	21.33	6.3	49.93	7.4	39.66
5	6.7	29.84	6.6	66.00	7.3	33.47
6	6.4	30.25	7.0	10.23	7.0	28.66
7	6.9	41.37	7.4	139.00	5.9	63.11
8	7.2	39.01	7.5	149.00	7.6	31.21
9	6.7	23.95	7.8	174.00	6.8	37.97
10	6.7	16.95	7.6	59.00	7.1	21.91
11	6.7	15.63	6.4	80.00	6.9	99.00
12	7.1	16.03	6.5	61.00	7.4	114.00
13	6.7	16.12	6.8	43.69	7.0	48.29
14	7.0	22.36	6.9	77.00	7.4	21.66
15	7.0	34.11	7.0	45.38	7.5	32.45
16	7.2	28.79	7.1	46.25	7.4	36.32
17	7.1	24.96	7.1	48.89	7.4	46.94
18	7.4	29.74	7.0	39.61	7.4	28.57
19	6.9	28.08	7.2	40.24	7.7	47.29
20	7.6	46.31	7.2	32.26	6.8	70.00
21	6.9	41.79	7.0	21.19	6.9	61.00
22	6.9	41.79	6.9	23.15	6.1	123.00
23	6.9	64.00	6.5	22.03	6.7	63.00
24	7.0	8.47	6.8	17.45	7.4	20.67
25	7.2	24.32	6.7	17.45	7.0	21.45
26	7.0	39.25	6.9	19.78	7.0	22.13
27	6.8	36.17	7.2	17.49	7.6	49.89
28	7.2	38.09	6.1	35.80	5.8	58.00
29	7.0	50.00	6.4	20.34	7.4	27.74
30	6.0	60.00	6.8	25.80	7.4	74.00
31	6.0	659.00	-	-	7.0	102.00

Site Report

Visit Yangon Again

Hanshin Water Supply Authority

Mr. Daiji Nagashio

As I wrote in the newsletter before (see [Newsletter Vol. 12, p. 6](#)), I was dispatched as a JICA Expert (water supply planning) to Yangon City Development Committee (YCDC) in Myanmar for 2 years from 2002. As Time passes quickly, more than 12 years have passed since I returned home. I got the opportunities to visit Yangon 3 times in the last 5 years. This time I report on what I felt when I visited Yangon again.

The streets with lots of greenery have not changed so much, but modernized airport and some flyovers have been built, skyscrapers are on the rise, and many restaurants with gorgeous lighting are in operation. At the time of dispatching, hygienic restaurants good for children were limited, and, we often relied on our house maid to procure daily foods. But now it seemed that the hardships of life are now being solved although prices have increased rapidly. In a sense, inconvenience was a fun of life in Yangon so I feel lonely a little.

The greatest pleasure when visiting Yangon was a



*At construction site of new WTP
(from left: Mr. Kinugasa, Mr. Zaw Min, Nagashio)*

reunion with Myanmar people I had known. In the YCDC City Hall etc, I was pleased that many staff remembered me and talked to me though it has been over ten years since I have left. Every time I visited, I was able to meet Mr. Zaw Min who worked together with me. As a responsible officer of construction of a new water treatment plant, he showed me the site. There, we talked on not only water treatment facilities but also the present of the staff I had known.

Also, I was able to meet Ms. Ei Khaing Mon, who participated in the training in Kobe last year, at the water quality laboratory, YCDC. I am glad to see her working so energetically. At the new YCDC building, I was able to talk to Mr. Watanabe who is dispatched from Fukuoka city and Ms. Yariuchi of WaQuAC-NET Office. Ms. Yariuchi walking with a parasol looks like a Myanmar celebrity, and she works actively.

I wish for the future development of water supply of Yangon City, and I look forward to the active participation of water related persons in Japan and Myanmar here.

Ms. Trang came with Mr. Nagashio as a mission member. Ms. Trang said “Wherever you go, WaQuaAC-NET will be standing by your side!” (Meeting again Ms. Mina, WaQuAC-NET on a business trip to Myanmar)



*Observation of training of YCDC Engineer
(from left: Yariuchi, Ms. Trang)*

Partnership between MWA and OWSA

Osaka Water Supply Authority
Shingo Hayashi

Technical exchange program between Metropolitan Waterworks Authority in Thailand (MWA) and Osaka Water Supply Authority (OWSA) will start this year 2017 based on the memorandum of understanding (MOU).

The relationship between MWA and OWSA started through JICA project (1979-1999). Though there had not been specific exchange for ten years after the project, the friendship deepened again by exchange (i.e., training and experts dispatch) related to JICA project "The 8th Bangkok Water Supply Improvement Project" implemented 2010-2012. The MOU was signed in 2012 to continue the relationship and to aim at further development of both organizations.

The topic of the technical exchange from 2017 is "water treatment and transmission" and "water quality control and risk management." The staff will be dispatched for training annually from both parties.

As a leading waterworks in Southeast Asia, MWA has high standard of technology. MWA has been actively exchanging experience with WaQuAC-NET, and it is expected that specific collaboration with waterworks as well as WaQuAC-NET will become improvement of water supply in the whole Southeast Asian countries.

Frank Chat by Anonymous NKK-no.3

Incredible India

K: Long time no see you. How was India? I heard Indian economy is so good.

N: I've eaten curry every day and got tired of it. So I don't want to go India for a while.

K: Was only curry a problem?

N: Yah, I had so many problems, indeed.

For the project running in India, flexibility is absolutely necessary. Economy? Town is lively. You know, Indian economic growth rate was 7.62% and overtaken China's 6.59%!

Y: GDP is the seventh in the world. Population is the second, had over 1.3billion. India is big country now.

K: So, Japanese government is keen on selling infrastructure such as rapid train, coal thermal power station. Nuclear generation, too?

Y: But, GDP per capita is roughly USD 1,600. It is the 143rd in the world and next to Laos. India is very famous with IT developed country but poverty rate is high, 23.6%.

K: I think people at the bottom of the caste system cannot get out of poverty. By the way, how is water supply condition in India? You would have taken hard time in the project.

N: Well, India's water supply conditions are improvement of water supply facilities cannot catch up with India's population increase. Population of capital city, Deli is 17 million. Coverage of water supply is 70%. Supply time a day is 3 hours. Ratio of non - revenue water is 50%, people said. Coverage of sewerage is around 40%. For that, water pollution of river and ground water become very sever. These situations are similar to other big cities.

K: Hum, the capital of great country, India is such

a situation. I think JICA implements so many financial assistances and technical cooperation, isn't it?

Y: Yes, Bengaluru, Guwahati, Deli, Goa, Agra, etc. JICA has been implementing yen-loan and technical cooperation such as NRW reduction projects there.

K: How were the results? Actuary, were there any problems?

N: Anyway, schedule was delay, delay, delay. Counterpart doesn't care to be delayed. Suddenly, they are called from minister or boss and activity stops. Schedule become no meaning! Indian believes in the afterlife. I think they can overcome the failure of actual world at the afterlife.

K: So, actual project delays!

N: Another constraint is a frequent personnel changes. Whenever counterpart also moves out to other department or province, technical transfer comes back to the beginning and project schedule delay as well.

Y: While India has high economic growth, delay of infrastructure's improvement becomes big problem. Water supply is one of them. Also, electricity is lack and black out happens frequently. The main reason is financial deficit

of government. They want to increase tax revenue. It is said income taxpayers rate is only 2 or 3 percent of total population. The Introduction of GST (Goods and Service Tax), which was a major reform policy of the Modi Administration established in 2014, has been postponed.

N: There are so many informal business in India. How does the government collect GST from them? It will be impossible.

K: How about water tariff in India? I think proper water tariff system is very important for sound management of water utilities.

N: I think there are many water utilities which cannot manage properly because of political intervention in tariff system. When they think cost recovery, they think only O&M cost and doesn't think payback of investment. Or, in case that provincial governments own utility and they don't have independent account, staff cannot have motivation for improvement of performance because they cannot get the result from improving revenue.

K: Is there any success case of sound management in India? Such as supplying safe water for 24 hours.

N: I heard Nagpur City in MAHARASHTRA Province has PPP (Public-Private Partnership) and supplies water to citizen for 24 hours by Veolia which is a big French company.

Y: Provincial governments which face sever lack of fund expect private fund, and privatization is expanding to big cities. Veolia and Suez contracted water supply management with Deli, Mumbai, Bengaluru, and etc.

K: PPP can change India's water supply or not!

Y: I saw a report that people living in a city said "before we pay tariff, corruption of water utilities and low level of management ability should be improved". People support Prime Minister Modi,



because he declared to stop corruption of officials.

N: But, in November last year, Prime Minister Modi suddenly announced; "existing 1000 and 500 rupees bills couldn't be used any more". And big confusion happened. New rupees bills were issued but didn't come to people quickly. I wanted to change old rupees to new ones. But, there were long que in front of bank. So, I gave up changing old bills and then couldn't go to

restaurant for 2 weeks. It was said the Modi government aimed to promote credit card usage and clean out habit of keeping cash in house instead of depositing at bank.

I have felt real **Incredible India** every day!
(by Yamamoto)



General Assembly Meeting 2017



Date: March 09, 2017

Place: Shinjyuku, Tokyo

Participants: Mr. Sasaki, Mr. Arimura, Mr. Yamada, Mr. Ono, Ms. Maeda, Mr. Horie, Mr. Igarashi, Ms. Yamamoto, Ms. Kamegai

Activities of 2016 were reported and main ones were as follows. meeting on "Water in Africa", the second Osaka meeting "International Cooperation of Japanese Water Utilities" following 2015, and support for presentation of Ms. Chaweepan of MWA at the 89th JWVA Conference, and dispatch of Mr. Sasaki to Thailand and Cambodia for biological issue. Based on these activities, accounting report of 2016 which Mr. Sasaki audited, was approved by the participants.

Thanks to Mr. Sasaki 's overseas activities, the members in Thailand and Cambodia have increased. Currently, there are 64 Japanese members, 1 corporate member and 68 overseas members; overseas members have surpassed Japanese members. There is also participation

from Africa like Malawi and Zambia and Japanese

members experienced Africa, increase, so WaQuAC (Water Quality Asian Cooperation) might be considered to change the name into WaQuAAC (Water Quality Asian & African Cooperation). Meeting of "Water in Africa" will be planned to be in sequel in 2017. Further activities should be considered how to proceed with technical support to Africa in the future.

At the meeting, Ms. Yamamoto informed that WaQuAC-NET applied for the Japan Water Prize given to the group which is doing outstanding activities for sound water circulation in Japan and abroad. We applied in last October and the result would be announced around April. If we win the prize, WaQuAC-NET activities, has entered the ninth year since establishment, will be stimulated and more encouraged.

Activity plan in 2017 includes the General Assembly as well as meeting in Kyushu Branch, and Osaka meeting as the regular ones, dispatch of experts to Thailand and Cambodia. In particular cooperation with PWA in Thailand will start. Moreover, mini-talk and trainees' support are also planned. Of course, welcome party to welcome overseas members to Japan will be held from time to time, so please join us again. Since the "Executive Forum for Enhancing Sustainability of Urban Water. Service in Asian" will be held with co-sponsored by JICA and Yokohama City from August 1st to 3rd in Yokohama, it will be good to

see you at the venue. SDDC (friendship party) is scheduled at that time. Also, our newsletter will be issued four times a year as usual. We are waiting for members' contributions. The publication of Q & A, and translation of "water meter management" is expected to be completed in 2017 as well. It seems that activities in 2017 will also be substantial. We ask for your active participation.

Mr. Igarashi popped in the general meeting. Although his expertise is on ITC, he got interested in water supply while he has worked to support for leakage control and GIS as a JICA Volunteer with Masai people in Naroc, Kenya. The talks

continued so actively that members did not have enough time to even hold their chopsticks. So the table was filled with many dishes. Thank you for everyone who participated. (by Kamegai)



Participants: (from left) Horie, Igarashi, Ono Kamegai, Yamamoto, Yamada, Arimura, Sasaki, Maeda)

Introduction of new members

- Mr. Luis Fukushima (Bolivia)
- Ms. Osamu Horiuchi (Japan)
- Mr. Hiroyoshi YAMADA (Japan)

***We welcome new members anytime
Please contact us***

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Next Activity

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| April 28 | Mini-talk "Financial analysis of water supply" |
| June 10 | Newsletter 33 in Japanese |
| July 10 | Newsletter 33 in English |