WaQuAC-NET Newsletter

Water Quality Asian Cooperation Network

http://www.waquac.net/english/

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For Safe Water, Do Network.

Happy New Year 2015

Hoping to keep Friendship and Safe Water!

WaQuAC-NET Newsletter vol.23 CONTENTS

Technical Q & A

Q: I have found a well with enough amount of water. Its arsenic concentration is 0.013mg/L while water quality standard value is 0.01mg/L. The concentration value can be 0.01mg/L by rounding. Then it can ensure the standard. Is such way right? (H.T., Africa)

A: Water quality standard of harmful substance is decided with considering its influence to human health. For chronicle toxic substance such as arsenic, standard value is decided as a safe concentration, no damage to human health, while a human drink the water for long term. Concentration of such substance must not exceed the standard value.

When the standard is 0.01mg/L, 0.011mg/L of concentration is considered as exceeding the standard. For this reason, official analytical method is requested that its sensitivity is lower than one tenth of the standard value.

For a case that exceeding standard is not frequent, water utility can supply water with restricted use, no drinking, no cooking, etc. While concentration exceeds the standard value, such water is not appropriate for drinking water. There is no way to loosen the standard because it is strictly bound to human health. Just same for any other harmful substances.

It is also expected that standard items on comfortableness, such as turbidity, color, chloride, iron, manganese, etc. do not exceed standard. In some countries, water utility can supply water when such items do not ensure the standard, though water utility should improve water quality to ensure all of standard items. But in Japan, all the items should ensure the standard when a water utility begins supplying water.

Hiroshi Sasayama

(Japan Water Works Association)

Report from foreign member: Indonesia

Overview about Tirtanadi Waterworks Company and Our Laboratory

Ms. Siti Zainab Lubis, Mr.Fauzil Husni

1. Medan City

Ms. Siti Zainab Lubis

Medan is the capital of North Sumatera Province in Indonesia. Located on the northern coast. Medan is the third largest city in Indonesia behind Jakarta, Surabaya, and also be as the largest city outside Java with the population at this present is about 2983868 peoples. Originally, Medan city is as a village called kampung medan (the Medan village) that founded by Guru Patimpus on 1590. At that time this village had only 200 peoples of population and led by Tuanku Pulau Brayan. In 1886, Medan formally obtained be as a city, and named the city of Medan until now.

(Medan city and Raya Mosque on 1925; Wikipedia)

Medan is located in 3°30' – 3°43' northern latitude and 98°35' - 98°44' eastern longitude, therefore Medan is tending to the topography of the sloping toward the north and be at the height of 2.5-37.5 meters above sea level. Medan has amount areas around 265,10 km^2 (10,240 mil^2) or 3.6 percent of the whole region of North Sumatera. At least nine rivers across this city, they are Belawan River, Badera River, Sikambing River, Putih River, Babura River, Deli River, Sulang-Saling River, Kera River and Tuntungan River. (Source: Wikipedia)

2. Tirtanadi Government Water Supply Company of North Sumatera Province

Tirtanadi is being Government Company of North Sumatera Province which moving in water supply for the people of North Sumatera especially the Medan city and surrounding areas. It is established on 1905 in the Dutch colonial government era and named as Waterleiding Maastchappij Ayer Beresih. In 1979, it is renamed as Tirtanadi Waterworks Company of North Sumatera Province as a form of a local enterprises of the provincial government.

Since 1999, Tirtanadi Waterworks Company have two service areas are Zone-1 (Medan and its surrounding area) and Zone-2 (cooperation with several districts in North Sumatera Province). Firstly, Tirtanadi Waterworks Company only using Sibolangit spring water to provide water needs for the citizens of Medan. Along with the increasing number of population, Tirtanadi had built a water treatment plant which use river water as its raw water. In that moment, Tirtanadi using two different river as their raw water from the main river of Medan which are Deli River and Belawan River. While the first Water Treatment Plant use the complete treatment system is Sunggal WTP had built in 1969.

Currently, Tirtanadi has 6 units of Water Treatment Plant and 5 units of Mini Water Treatment Plant. Combine with several units of deep well, the

production capacity earn 5530 L/sec for Zone-1 and 493 L/sec for Zone-2.

Supported by 3565639.48 metres of its total length of pipelines, Tirtanadi has been serving 460036 households now. Also with 24 service hours, Tirtanadi gain the service coverage for citizens of Medan in 73.16 %. Supported by 2127 employees, so the ratio for employees per 1000 customers is 4.62. With average drinking water consume for each customer for a month is 27 cubic meters. Now, the average of the Non-Revenue Water for Zone-1 is 25.74 % and 17.11 % for Zone-2.

3. Cooperation with Yokohama Waterworks Bureau and Yokohama Water

The cooperation between Tirtanadi Waterworks Company and Yokohama Waterworks Bureau is related to effort to decrease the Non-Revenue Water. One form of this cooperation is training of operation and maintenance of distribution pipelines utilizing water leakage detectors focused on resin pipes. Furthermore, we also cooperate with Yokohama Water for DMA's pilot project and reimplementation to reduce rate of Non-Revenue Water. This cooperation has been going since October 2013 till March 2015.

4. The Main Laboratory of Tirtanadi Waterworks Company

Tirtanadi has owned a main laboratory to support guarantee of water quality which is distributed to our customers. Our laboratory was established on 1978. Besides the main laboratory which located in the Headquarter in Jalan Sisingamangaraja No.1 Medan, there are few mini laboratories in each of our water treatment plant. Since then, the main laboratory has been examining for microbiology testing.

For now, the main laboratory has added several parameters to fulfill the applicable standard of health regulations from The Ministry of Health of the Republic of Indonesia *(Number 492/MENKES/PER/IV/2010, April 19th 2010)*. We also had received Certificate of Accreditation as an Examiner Laboratory referring to general requirement for competency of examination laboratory, issued by *Accreditation National Committee*. This accreditation was effective since July 22nd 2005 till July 21st 2009.

Besides of intern samples from our water treatment plant, we also provide testing for water samples from any other customer with the applicable tariff, so the cost of their examination can be added as income for our company.

Our laboratory and staffs
(Mr. Fauzil Husni is 6th from the right)

The laboratory has 18 employees, consists of our Chief, 2 supervisor staffs, 2 administration staffs, and 13 analysts. As shown in this photograph, there are 16 laboratory staffs, while the other two persons are doing their job to take random samples from our water treatment plant. Currently, we had some main instruments and equipments for testing such as UV-Vis Spectrofotometre, Atomic Absorption Spectrofotometre (AAS), etc.

Instruments in our lab

We have a view that the laboratory has important role to maintain the quality of water that distributed to customers. However, because of less financial, competency and available equipments, we admit that our facility does not fulfill the feasible examination laboratory, so that impact to our quality of examination result.

Because of those disabilities, so there are several compulsory parameters which we can not do the test such as Selenium metal (Se) and Arsenic metal (As) because of our instrument ability limitation and equipments to support the testing. In addition, with increasing in intensity of service, we also need a more efficient methods for microbiology testing both physics and chemistry testing. This time, there are few opportunities for analysts to follow the training in increasing their competence, whereas we also known that many of this trainings are highly needed to improve the quality of our testing results. So that we really hope the cooperation with Yokohama Waterworks Bureau will also improving our laboratory facilities and our testing quality. Hopefully this cooperation can be realized soon.

＊Information from WaQuAC Office＊

Ms. Siti Zainab Lubis and Mr. Fauzil Husni newly joined WaQuAC-NET in June 2014, thus asked to give brief introduction of their water supply utility and service area. Besides Yokohama, Medan has cooperation and friendship with other Japanese cities such as Toyohashi of Aichi, Ichikawa of Chiba.

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Workshop on "Arsenic Contamination and Removal from Groundwater"

September 5, 2015 in Osaka

Reported by Shingo Hayashi

(Osaka Water Supply Authority)

A Workshop on "arsenic contamination and removal from groundwater," which was also an exchange meeting of the former JICA experts and the people concerning international cooperation in water supply sector, was held in the evening of September 5th for the first time in Osaka.

Ms. Soursdey, WaQuAC-NET member and Hiroshima University student from Phnom Penh Water Supply Authority (PPWSA), gave a presentation on the study at the graduate school. Dr. Yoko Fujikawa, Associate Professor of Research Reactor Institute, Kyoto University, gave a special lecture on the latest results.

The participants were Mr. Miyauchi, Mr. Nagashio, Mr. Ozaki, Mr. Sugino, Mr. Fujitani, Mr. Koseki, Hayashi from the Kansai region, Mr. Saeki from Matsuyama-city and Mr. Takebe, Mr. Sasayama, Mr. Sasaki, Ms. Yariuchi, and Ms. Yamamoto from Tokyo. Including 13 non-members, the number of the participants was 26 in total.

The presentation was given after the speech of the representative, Ms. Yamamoto, and self-introduction of the participants.

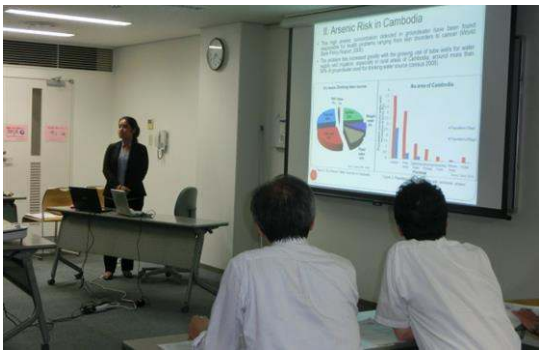
The outline of the presentation is as follows.

1. Situation of Arsenic Pollution and removal systems in Cambodia

Ms. Hul Soursdey

【Abstract】

Ms. Soursdey briefly explained contents her master thesis of Department of Development Echnology at Graduate School for IDEC, Hiroshima University, on effectiveness of arsenic removal systems. The study was conducted though field survey and arsenic concentration of 28 sites of arsenic removal



systems (ARSs) in Cambodia. In the study, arsenic concentration of each system was compared both in rainy and dry season, and pre- and post- treatment. Additionally, questionnaire survey was conducted for suggestions for sustainability.

Water quality analysis was supported by Mizuken Co., Ltd.

【Contents】

○ Situation and risk of arsenic contamination in Cambodia

Population at arsenic risk is around 320,000 in central south (near Phnom Penh) of Cambodia, and the seriously affected area is around 1,000km^2 where people use ground water for drinking.

○ Arsenic Removal System installed in Cambodia (Abbreviated name of each system is followed by the number below)

① SARSAC:

Installed by collaboration between the Institute Technology of Cambodia (ITC) and Lehigh University, USA.

Principle: Adsorbent technology. Re-generable adsorbent media (hybrid arsenic-selective absorbent or hybrid anion exchange or resin HIAX) with sand filter.

② SAR (Subterranean Arsenic Removal):

Installed in collaboration between Queen's University Belfast (QUB) and Royal University of Phnom Penh (RUPP).

Principle: Oxidation, without production of sludge & not using any chemicals.

・ Aerated groundwater is recharged back into the aquifer for oxidation zone making, which can trap iron and arsenic on the soil particles through adsorption process.

・ The oxidation zone created by aerated water boosts the activity of the arsenic-oxidizing microorganisms, which can oxidize arsenic.

③ Lien Aid:

Installed by Lien Aid (NGO).

Principle: Adsorbent technology with adsorbent media combined with bio-sand filter and Chlorine powder.

④ Japanese:

Installed by collaborative project between Japan and Cambodia, supported by NEDO.

Principle: Adsorption Technology; the patented AMORPHOUS IRON-(HYDR) OXIDES technology have been developed for this systems, wherein which its adsorbent was developed at Kochi University, Japan.

⑤ Napa follow-up:

・ Installed by ITC in collaboration with Ministry of Water Resource and Meteorology (MoWRM) and MAFF.

Principle: Adsorption Technology.

○ Field Survey

・Sampling and water quality analysis

・Interview with stakeholder of related organizations

・Questionnaire survey with affected people to know the perception and their involvement for ARSs.

○ Results of water quality analysis (Arsenic concentration)

Rainy season	pre-treatment:	3～1000μg/L
	Post-treatment:	<1～1100μg/L
Rainy season	Pre-treatment:	3～620μg/L
	Post-treatment:	<1～500μg/L

○ Effectiveness of ARSs

・Out of the targeted 28 ARSs, 13 ARSs (46.4%) are working and the others do not work.

・9 of 28 ARS (32.1%) are not functioning according to the water quality result.

・ Both results suggested ARS implementation as arsenic mitigation option were not successful in Cambodia.

○ Results of interview survey

The follows were found:

- Lack of Management by installers: Management is key term for successful and sustainable project.
- Lack of Collaboration: It's very necessary to cooperate between the responsible government and project managers.
- Lack of Communication and Education for affected people
- Lack of Finance for maintenance and water quality monitoring
- Lack of Participation for maintenance and using system

○ Conclusions

Based on field survey and analytical results:

・ Successful case = 32% (working and functioning)

・ Out of 10 ARSs where data is available, ratio that their water quality satisfys WHO Guideline (10μg/l) is only 40% in rainy season and 60% in dry season.

・ The ineffectiveness and non-sustainability of ARSs implemented in Cambodia are not only by technical aspect but the lacking of management, collaboration communies' involvement and financial aspects.

・ SARSAC (ITC) were identified with the most successful system.

○ Recommendations

The most important aspect for sustainable ARSs implementing is to bring the awareness of people though providing information of arsenic issue.

2. Advanced biological treatment of groundwater with elevated concentration of arsenic and ammonium

Dr. Yoko Fujikawa
Associate professor, Kyoto University

【Abstract】

The situation of arsenic (As) contamination of groundwater in Vietnam and the development of As removal system using iron oxidizing bacteria (IRB) are reported. Pilot scale study on As removal by IRB method was implemented in Japan (2004~) and Hanoi (2009~). Full scale treatment plant started operation in 2012 in Ha Nam Province in Vietnam. The mechanism of IRB method, As removal efficiency and cost-effectiveness are discussed.

【Results and discussion】

○ Arsenic contamination of groundwater in Vietnam

・Occurrence of high level of As in groundwater is surveyed in the northern part of Red river watershed and Mekong river watershed in Vietnam.

・ 10% of the groundwater samples contain exceeding 10μg/L of As in the most communities in Ha Nam Province (UNESCO, 2004-2005).

・In Vietnam, primary intake route of As is via drinking groundwater in the dry season, since rainwater is used for irrigation and drinking water in the rainy season.

○Mechanism of IRB method

・Naturally existing IRB in groundwater oxidizes dissolved ferrous iron (Fe) and manganese (Mn). For As removal, As is deposited on particulate form of oxidized Fe/Mn in the filtration column.

・IRB is colonized in the filter media by continuous percolation of groundwater. Dissolved Fe and Mn are oxidized by bacteria so that Fe and Mn are removed in the filer media.

・Regular backwashing is required for filter media. However, removal efficiency is recovered immediately after backwashing.

・Size of filtration basin can be reduced because removal rate of Fe and As is not decreased at high filtration velocity (e.g. 600m/day).

・Arsenic removal rate is decreased over running time with ordinary IRB adsorption treatment. By this method, however, As removal rate is stable by

applying optimized backwashing.

○Pilot scale study (2004~)

・Removal efficiency was confirmed by the pilot scale study conducted in Japan (2004~) and Hanoi (2009~).

・Simultaneous removal of Fe, Mn, As and ammonium nitrogen (NH_4-N) was possible at LV 600m/day.

・The results in Vietnam showed higher As removal rate (Average 87.4%) than in Japan in spite of high As concentration comparing with Fe. This result was considered to be caused by high water temperature.

・As (Ⅲ) was removed effectively in Vietnam, although the ratio, As (Ⅲ)/ As (total), was more than 90%.

As (Ⅲ) was directly adsorbed to the media, which was observed in X-ray absorption spectroscopy.

○Full scale treatment plant (2012~)

・Plant capacity: 600m^3/day

・LV(linear velocity): 65~80m/day

・NH_4-N: approximately 25mg/L

・As level: average 200μg/L

・As removal rate: 70~80%

・In Ha Nam Province, the groundwater contains high level of As and NH_4-N simultaneously.

・Large portion of the remaining As in the effluent was As(Ⅴ). Approximately 70% of As (Ⅴ) was removed by adoption of ferric chloride and sand filtration.

○Treatment of high concentration of NH4-N

・At the facilities in Ha Nam Province, 40% nitrogen removal was achieved by anammox (anaerobic ammonium oxidation) system.

・High removal efficiency was obtained by restraining the growth of nitrite oxidizing bacteria under control of temperature, pH, and DO, etc.

○Cost-effectiveness of IRB method

・The results of LCA (life-cycle assessment) showed that cost of construction and treatment chemicals would be significantly reduced compared with conventional treatment (e.g. pre-chlorination, coagulation, Mn contact filtration). Sludge treatment facility also can be reduced. Electricity cost is major concern for IRB method.

・Low cost and easy operation/maintenance are advantages of IRB method.

【Impressions】

Ms. Soursdey gave a presentation confidently. Dr. Fujikawa explained difficult matter clearly. The participants were very interested in IRB method because it is simple and effective for As removal.

Ms. Yamamoto's advice, "we should learn from the experience in Bangladesh," was useful to consider the problem about As contamination. Arsenic problem was featured in the Newsletter No.5. (http://waquac.net/english/pdf/newsletter201002_en.pdf)

We had many participants; former JICA experts, people who took JICA training in the past, etc. This was good opportunity to meet and exchange views each other.

After the workshop, we had farewell party for Ms. Soursdey. She seemed to feel relieved to finish the presentation and we promised to meet her again.

＊The presentations of this workshop are available at our website: http://waquac.net/english/data.html

Cooperation to Biological Survey in Thailand

～Ms. Sivilai and Ms. Uan visit to Japan～

Ms. Sivilai and Ms. Uan who are senior scientists of MWA (Metropolitan Water works Authority), and members of WaQuAC-NET, came to Japan for making the report and participating the Water Conference of JWWA (Japan Waterworks Association). Their schedule was following table.

10/23	Arrived at Haneda	Tokyo
10/24	Work for making the report on the biological survey of water resources for water supply in central Thailand	〃
10/25	Rest	Yamanashi
10/26	Visit to Okutama lake which is water source of Tokyo metropolitan waterworks bureau	Tokyo
10/27	Courtesy call to JICA, JWWA, Welcome party	Tokyo, Yokohama
10/28	Courtesy call to International Department, Kanagawa prefecture government, Samukawa WTP	〃
10/29	JWWA meeting for research presentation	Nagoya
10/30	International Forum on Water Supply	〃
10/31	JWWA meeting for research presentation	〃
11/01	Rest	Yokohama
11/02	Finalizing the biological survey report	〃
11/03	Leaving to Thailand	

Ms. Sivilai had visited to Japan for exchanging her experience of heavy disasters with Sendai Waterworks Bureau and others in April, 2012. (refer to http://www.waquac.net/pdf/newsletter201205.pdf)

This time, their main purposes to come to Japan were completion of the report on the preliminary biological survey of water resources for water supply in central Thailand. MWA carried out the survey in six dam reservoirs where are main sources of MWA in July 2014. WaQuAC-NET cooperated to the survey sending an expert.

MWA is facing several biological problems in WTP since raw water canal was contaminated by the heavy flood in 2011. WaQuAC-NET has been cooperating for improving their situations. This year, WaQuAC-NET sent Mr. Sasaki as biological expert responding MWA's request for joining the survey team headed by Ms. Sivilai. The team with Mr. Sasaki surveyed 6 dam reservoirs and related rivers. They collected 61 samples at 14 places. It became big survey covered main water basins in Thailand. 61 samples were examined by Mr. Sasaki. This preliminary survey was also OJT for MWA staffs. And staffs of PWA (Provincial Waterworks Authority) were invited in this OJT.

The result of biological examination revealed following things; eutrophic situations of 6 dam reservoirs, algae to be seen well in each reservoir and their numbers, reservoir to be stratified, reservoir which is contaminated more and needs regular monitoring. Based on the result of examination, Ms. Sivilai, Ms. Uan and Mr. Sasaki made a report (in Japanese and in English) on October 24.

Ms. Sivilai and Ms. Uan made a courtesy call to department of global environment, JICA on October 27. They exchanged their opinions about future cooperation between MWA and Japan because

From Lef:Ms. Sivilai, Ms. Uan, Ms.Yariuchi, Mr. Aoki, Mr.Iwasaki, Deputy general director Ms. Tamura, Director of water resources, JICA)

JICA capacity development project finished in 2013.

Continuously, they visited to JWWA and met Mr. Matsui, former director of international department, Mr. Miyagaki, senior researcher and Mr. Sasayama, and Mr. Kudo, specialists for water quality control.

Ms. Sivilai presents 100 years anniversary stamps to Mr. Matsui, former Director, International department, (JWWA)

On 28, they made a courtesy call to international department, Kanagawa prefecture government for overseas' technical training course in which a staff of MWA, Ms. Oil is training. They also observed OJT of Ms. Oil and encouraged her in Samukawa WTP.

Ms. Sivilai and Ms. Uan participated JWWA international forum and meeting of research presentation held in Nagoya city from 29 to 31. The report of JWWA conference and meeting are written by Mr. Inoue on page 13.

From left; Ms. Sivilai, Ms. Oil, Yamamoto Ms.Uan, Mr. Inoue, Mr. Sasaki

The report on biological survey was completed including a recommendation of four times plenary surveys next year on November 2.
They went back to Thailand taking the report on 3.·And they met governor of MWA for explaining the report on 4. Governor agreed with the recommendation, Ms. Sivilai said.

MWA celebrated 100 years anniversary of Bangkok water supply on November 14

(by Keiko Yamamoto, WaQuAC-NET Office)

～A discussion meeting to look back on Executive Forum (No.1) ～

Proper operation and power consumption reduction of the pump

October 15, 2014

Members: Yamamoto, Yariuchi, Matsubara, Honda, Aoki, Ono

Purpose of this discussion

Yariuchi: "The 3rd Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region" was held in Yokohama, Japan, from July 1 to 4, 2014. WaQuAC-NET planned a discussion meeting to make use of the suggestive argument in this forum. This time, the topic of discussion is about session 2, technical part of this forum which is our concern. And the participants are Aoki (JICA), Matsubara (Nihon Suido Consultants Co., Ltd) they took part in the forum as a sponsor and Ono (Yokohama Waterworks Bureau), Honda (Tokyo Metropolitan Waterworks Bureau) as an expert for maintenances of water facilities. I think we argue about this topic founded on exchanged opinions in the forum.

Summary of session 2 in the Executive Forum

Yamamoto: Then, please explain the summary of topics for session 2.

Matsubara: Session 2 covers comprehensive topics regarding Operation and Maintenance (O&M) and water quality management. Participants learned the importance and role of leaderships in through the discussions on three presentations about good O&M practices from Philippines, Vietnam and Yokohama in Japan.

Yamamoto: I was impressed by the presentation from Mr. Ernie T. Delco of Metro Cebu Water District (MCWD) about “Good Practices on Maintenance and Procurement”.

Matsubara: Mr. Ernie made presentation for three topics: Non Revenue Water (NRW) reduction, preventive maintenance and appropriate procurement.

First topic is about NRW reduction and pipeline maintenance. MCWD had suffered from high NRW of 45% in 1984. He investigated what is behind the leakages and found out that 99% of leakages are caused by the problems of service connections (supply pipes and customer meters). They took many countermeasures such as; (1) use of polyethylene (PE) pipes for service connection, (2) development of *Stub-out* and (3) satellite offices to achieve quick leakage repair reaction. Thanks to the effective countermeasures, MCWD reduced its NRW to 25%.

Second is about Preventive maintenance for Pumps and Meters. He presented about (1) strategic monitoring for energy consumption introducing a Performance Indicator (PI); *Specific Energy Consumption*, (2) replacement of pumps and meters and (3) repair and replacement of meters

The last is about Procurement for appropriate equipment and materials. MCWD has a policy for procurement by bidding that “the meters shall be tested for accuracy and durability by MCWD in advance to the procurement”. They are making a

technical manual speculating their procurement policy which considers Life Cycle Cost (LCC), easy installation and availability of spare parts.

Yamamoto: This time, Ono and Honda, have a lot of experience O&M facilities of the water purification plant, participate in this discussion meeting. So we will discuss the under the theme of “Proper operation and power consumption reduction of the pump.”

Yariuchi: In the case of MCWD, they are monitoring the energy consumption of pumps in order to find out an inefficient operation and some troubles. Specifically, what would they have been monitoring?

Ono: They are monitoring the value of electric power consumption per water distribution volume. This value is defined as one of PI for water supply services, "the effort to save energy" in Japan. It is a good viewpoint to inflect for an indicator for the maintenance of the pump. And It can utilize in all waterworks because easy to calculate if we can monitor water distribution volume and electric power consumption. Specifically, it can calculate electric power consumption of pumps (kWh) divided by water distribution volume (m^3).

$$\textit{energy consumption of pumps } (kWh/m^3) = \frac{\textit{electric power consumption of pumps } (kWh)}{\textit{water distribution volume of pumps } (m^3)}$$

Aoki: It may be an effective measure to reduce power consumption on pumping because electricity cost is generally high and it accounts a large part of

expenditure, which places a financial burden on water utilities in developing countries. But firstly, water flow meters should be installed to calculate accurate energy consumption.

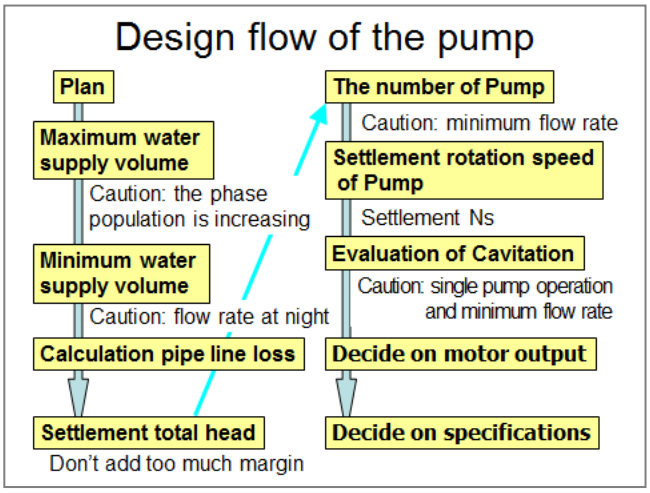
Yamamoto: What kind of case does the pumping power consumption be increased?

Ono: There are various reasons. In the case of using submersible pump, normally used at Cebu Island, it is major reason that the bearing is broken by a seal deteriorating, and being flooded.

Yariuchi: Generally, how many years do a seal and the bearing needs to exchange?

Honda: It depends on what kind of pump is used for. In Tokyo's case, large capacity pumps for such as intake, transmission or distribution pumps will be overhauled every 8 - 15 years or every 40,000 - 50,000 operation hours on the basis of maintenance criteria. On the other hand, small capacity pumps for such as sampling or other submergible pumps will be repaired every 2 - 5 years. It is better overhaul periods should be determined by each experience because of the differences of water such as raw water or purified water, environmental conditions such as temperature or humidity, operation time of pump, and so forth.

Aoki: Pumping power consumption becomes less efficient by deterioration of equipment. Addition to this, it could be an installation of pumps with inappropriate pump head, capacity and operation efficiency due to insufficient prior study.



Ono: Right. It is very important to install appropriate pump. And the phase population increasing, water demand does not reach planed demand for a while. In this case, we also have to design the capacity of pump with care

Matsubara: Practically, supply amount is basically designed according to the water demand projection in a target year which is set certain years later. It is important to arrange the capacity and numbers of pumps appropriately not only for the demand in the target year but also for that in right after the service commencement when the supply amount is low.

Yamamoto: If it is installed inappropriate capacity of pump, then what will happen anything else?

Ono: In the case the capacity is short, defective water supply, low pressure or water outage, is occur. Conversely, if the case of capacity is too much, the pump will be failed because of cavitation of pump or overcurrent of motor. When we design pump we are apt to think to add much margin. But it is important to design appropriate capacity of pump. (About cavitation: refer to WaQuAC-Net Newsletter No.17), *http://www.waquac.net/english/pdf/newsletter201304_en.pdf*

Yariuchi: Please tell us the points we must pay attention to check pumps.

Honda: In general we check leakage from grand packing or mechanical seals, abnormal noise from motors, temperature of bearings and grease. Moreover it is also important to check water flow rate and pressure, and to keep the recodes. Comparing current data with the previous recodes, we can find what is wrong with the pump.

Aoki: It is also important to record a precise water flow rate by measuring with flow meter. Flow meters will be needed to calculate energy consumption efficiency and non-revenue water, therefore I would like water utilities to determine to install them.

Yamamoto: I think a portable type flowmeter can

install for measuring flow rate temporarily. Is there another method without flowmeter to check the pump operating properly or not?

Ono: There is another method to monitor the distribution water pressure of the pump. This method can apply without flowmeter.

Yamamoto: Do you mean to check whether water pressure is abnormally high, or not? Does every pump have a water pressure gauge?

Honda: Almost of pumps have pressure gauge at discharge pipe. If not installed, Bourdon tube type gauge can easily install with low cost.

Each pump has a rated pressure, and we can identify this value on a manufacturing name plate. If there is a great difference between rated pressure and current pressure, the pump might be running inappropriately. In addition we can find some troubles to monitor the change of daily pressure data.

Ono: The procedures of energy consumption reduction measures are as follows. First, we monitor the value of electric power consumption per water distribution volume at each pumping station. So we can identify the pumping station with high electric power consumption rate, same as having a lot of energy losses. Next, we check the condition of each pump in detail, and repair or replace to appropriate capacity one.

Yariuchi: The discussion doesn't run out, but time is coming. Thank you for a fruitful discussion. We hope this discussion is useful for management of each waterworks. We are planning next discussion meeting on a different theme. Please look forward to it.

(by Yoshinobu ONO,
Yokohama Waterworks Bureau)

Reference: JICA home page "Yokohama Forum Statement 2014"
(http://www.jica.go.jp/information/seminar/2014/ku57pq00001n9xqi-att/kf20140728_02_02.pdf)

【Report】
Presentation in General Assembly and Conference 2014

October 29 to 31, 2014@Nagoya

Satoshi Inoue
(Yokohama Waterworks Bureau)

Japan Water Works Association General Assembly and Conference 2014 (Water Research Conference) were held in Nagoya Port-messe, Nagoya City, from 29th to 31st October, 2014. This year is the just 100 anniversary from water supply start in Nagoya City, and it was held in gorgeous atmosphere.

This year, the total 369 research were reported in 11 sessions. I reported "Technical Cooperation of Yokohama Waterworks Bureau (YWWB) to Metropolitan Waterworks Authority (MWA) in Thailand against Filter Clogging by Algae" in English department. Please refer about research contents, WaQuAC-NET newsletter No. 18, "The water source survey and workshop on the problem of the algae in MWA". (http://www.waquac.net/pdf/newsletter201307.pdf)

In addition, as the first attempt, "International Forum on Water" was held in cooperation with the Ministry of Health, Labour and Welfare and IWA Japan-YWP in the afternoon of the 30th.

Participating organizations was the 10 organizations, each Water Works Association of South Korea, Taiwan, Philippines, Thailand, Malaysia, Indonesia, India, Australia, the United States and the

International Water Association (IWA). Theme was "Challenges and the Future of Water Supply", and each Water Works Association reported case study about the excellent efforts of the water supply of each country and the future of water supply.

Ms. Sivilai KITPITAK and Ms. Chaweepan SUANGKIATTIKUN took part in this conference, and they were coordinator of our YWWB members, when we are dispatched to the MWA. One of the purposes of the visit to Japan of them, it was to participate in this conference. They had spent meaningful time to renew their old friendship with Dr. Tambo, former President of Hokkaido University.

Introduction of New Members

- **Ms.Patcharaporn Itthirotjanakul (Thailand)**
- **Mr. Nobuo Kajino (Japan)**
- **Mr. Kiyoshi Miyauchi (Japan)**
- **Mr. Koichi Matsubara (Japan)**
- **Mr. Yoshinobu Ishibashi (Japan)**
- **Ms. Truong Nu Nhu Ngoc (Vietnam)**

◎ We welcome new members anytime◎
Please contact us

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Next Activity

Feb 2015	Water source survey in Thailand
Feb 2015	Mini-Lecture (2)
Feb 2015	Newsletter vol 24 (JPN)
March 2015	Newsletter vol 24 (ENG)