WaQuAC-NET Newsletter

Water Quality Asian Cooperation Network

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

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For Safe Water, Do Network.

WaQuAC-NET Newsletter vol.21

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Question & Answer Corner

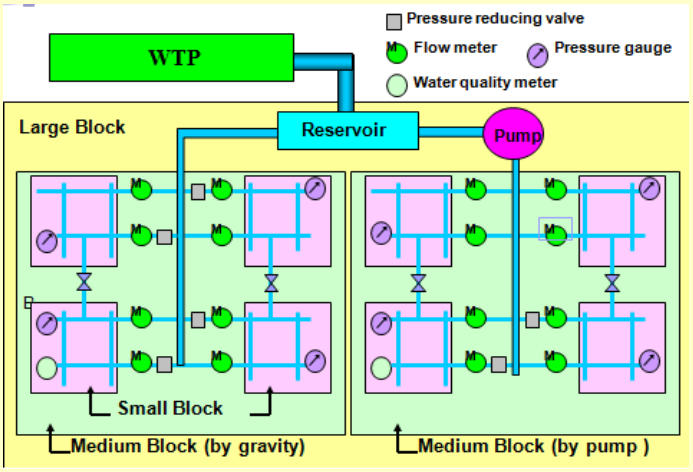
We welcome any opinions, and questions to this Q & A Corner.
Please contact us.

Q: I heard that "Block Distribution System" is effective for measures of leakage reduction and water pressure control.
I would like to know the block distribution system. (Mr. R.T. India)

A: The Block Distribution System (BDS) is the distribution system to regulate the distribution pressure centering on each distribution reservoir. In Yokohama Waterworks Bureau, this system has been adopted since 1971. Distribution block contains a large, medium and small block. Large block is an entire area where water is supplied from a distribution reservoir. Large block is divided into two blocks, pump system area and gravity flow system area, by the difference of the way to distribute water from a distribution reservoir. We call them medium blocks. Moreover, medium blocks are divided into small blocks by the distribution pressure and population in the block. In the small blocks, distribution pressure and population is stably kept within a defined range so that it makes water distribution easily controlled.

Additionally, connection pipe between the blocks can make mutual backup of water supply. Since influence of suspension area or suspension time by pipe construction work and accidents can be kept to a minimum, we can supply water stably anytime 24 hours.

In Yokohama, though it's undulating landscape because of many hills and valleys, we ensure stable 24 hours water supply because we innovated the BDS before the rest of Japan.



Example of Block Distribution System
(Source: Training reference of Yokohama WWB)

● In many developing countries, District Metered Area (DMA) is often used to supply water. This system is as same as small block of BDS.

DMA means the divided area to control the amount of water by the meter. We can know the amount of water loss by the deduction of the total amount of water consumption in each house inside the area from the amount of influent water into the area.

(amount of the water loss[m^3] = amount of the influent water[m^3] – total amount of the water consumption [m^3])

By this account, we can know the percentage of non-revenue water.

(percentage of non-revenue water[%] = amount of the water loss[m^3] / amount of the influent water[m^3]×100)

We can't know the amount of water consumption in each house at the same time because it is measured when the meter is read. Thus there is a little bit of lag time between the amount of the influent water and water consumption, accurate percentage of non-revenue water can't be calculated. But it is enough to recognize the trend of the non-revenue water.

For accounting the accurate amount of water loss, we should set up the meter with data-logger which can measure the small amount of water. In order to know the amount of water loss, we conduct minimum night flow test which measures the minimum night flow in the DMA and defines the moment when no water is used, in the DMA. The amount of water flow of the moment means water loss. (sampling interval is about 2 sec.).

This method requires measuring the minimum night flow for more than a week to know the accurate minimum flow. So we should set up bypass pipe or switchover equipment to shift from an ordinary flow meter used in the daytime to a more accurate minimum flow meter in the night.

When we divide the DMA, we have to consider the ground height. Because the water pressure for the high ground is reduced and one for the low ground is raised, DMA should be divided in the case of extreme difference in the height.

Mr. Kenji Nakanosono
(Yokohama Water Co.,Ltd)

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2. Information of Oversea Member

Welcome to Japan!

The 4th ASHIGARU party

On April 24, at "Tori-En, Shinjuku, Tokyo

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Mission team headed by H.E.Ek Sonn Chan from Cambodia visited Japan from April 20 for 5 days. The members are H.E. Ek Sonn Chan (ESC), former Director General of Phnom Penh Water Supply Authority, currently Secretary of State of Ministry of Industry and Handcraft (MIH), Mr. Tan Sokchae, Deputy General Director of MIH, Mr. Tan Soviddhya, Director of Department of Portable Water of MIH, Mr. Preap Somara, Director of Kompong Cham Waterworks, and Mr. Uth Kleng, Deputy Director of Battambang Waterworks, 5 members in total.

As same as the other time, their schedule was so tough; at 17:00 of the day they travelled back from Kitakyushu City to their accommodation in Shinjuku, Tokyo. Without any rest, they moved to the venue "Tori-En" taken by Mr. Kiyama.

To welcome them, Japanese members totally 15 got together; Haga, Hashimoto, Tomioka, Mitake, Sasayama, Takeda, Sugawara, Nakanosono, Kamegai, Kiyama, Ishii, Yariuchi, Suzuki, Yamamoto, Sasaki.

The venue "Tori-En" is a grilled-chicken dining bar, located just nearby Shinjuku Station, Tokyo, and meets requirement of ASHIGARU meeting "SDDC" standing for Small, Dark, Dirty and Cheap. I was worried whether all participants could successfully reach to the bar because stairs to the 3rd floor was so dark and steep, moreover there was a strange door on the way. In spite of my concern, most attendants got together in time; I was impressed that they were all self-helped, independent people, as it was expected.

In the party, H.E.ESC and other Cambodian members showed up and had a blast; especially he gave hugs and shaking-hands to all people. Cannot wait for toasting, people started happily talks. In particular a group related to the technical cooperation project phase 1 in Cambodia had traveled from Kitakyushu and was flying to

All attendants

Cambodia just after the party. He was so active as great fun for reunion with Mr. Ishii who attended this ASHIGARU meeting first time. He had just ASHIGARU to be! Another cheer arose in center of the table. Ms. Suzuki, arriving late, drank beer with Cambodian members with her arm crossed with theirs. Ms. Kamegai, Ms. Yariuchi and Mr. Haga received hugs from H.E.ESC. (Mr. Haga said the hug was so tight!) Such a happy time flied past quickly, and H.E. ESC had a talk at the end. "I am really happy to meet all people and have 4th ASHIGARU party with big fun, and hope to have 5th and 6th ..." (By Shinichi Sasaki)

3. Activity in the world <Report-1>

Water Supply Situation in Timor Leste

Yasuo Kobayashi
(Chiba Prefecture Waterworks Bureau)

Mr. Kobayashi

When I met my old friend who is working for Chiba Prefecture Waterworks Bureau, I heard that Mr. Yasuo Kobayashi was dispatched to Timor Leste by JICA as an expert in 2012.

I went there as a member of JICA mission in 2007. At that time, public security of Timor Leste was poor. Sometimes, riots by young men had happened there. They had thrown stones and burned tires in main roads. So, we were not able to implement enough study. Seven years has passed since I visited. I wonder whether the situation has become well or not.

He stays there with his family and is working very actively. I asked him to the report on the situation of water supply in Timor Leste and his activities. (Keiko Yamamoto, WaQuAC-NET Office)

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1. Outlook of Timor Leste

Republic Democratic of Timor Leste (RDTL) is located at the southeast of Lesser Sunda Islands in Indonesia far from about 300km of east of Darwin in Australia and is the newest country in Asia that could finally win independence from Indonesia in 2002. The country's size is about 15,000m^2. The capital is Dili. The population in the country was

estimated as about 1.21 million as of 2012 and is especially concentrated in capital area. About 200,000 live in Dili. As to tribal distribution, the main tribe is Melanesia followed by Malay, Chinese and others. As to religion, 99% of population professes Catholicism.

Dili is a center of country's politics and economics. However, office tower and industrial area cannot be seen because many buildings and public infrastructures were destroyed in the war of independence. When travelers walk around the city, they will discover many ongoing constructions of infrastructure rather than destroyed buildings and can feel that RDTL has overcome past tragedy and stepped into developing stage from rehabilitation stage. Now,

Center of Dili

would-be, the tallest building with 12 stories for Ministry of Finance is being constructed.

2. Drinking water supply system in RDTL

Drinking water supply system in RDTL is managed by DIRECÇÃO NASIONAL DOS SERVIÇOS DE ÁGUA (DNSA) that I am working for. DNSA mainly takes care of urban piped water supply system in terms of design, installation and O&M, putting headquarter office in Dili and 13 branch offices in each district. It allocates the budget and takes top-down directions and orders. For rural water supply outside of DNSA's jurisdiction, DNSA installs simple water supply system and hands over the system and O&M to community after giving technical lessons. Unlike self-support accounting system taken by many other drinking water supply utilities, the budget for DNSA is completely supposed to be allocated by government of RDTL.

As to tariff, it had been collected in the partial area of Dili until riot happened in 2006. However, after the riot, it was interrupted from 2006 to 2012. In 2013, it was started again in the partial area of Dili. The tariff is basically designed at metered rate as 0.2USD/m^3 less than 14m^3 and 0.4USD/m^3 more than 14m^3. Detail design of tariff system is now in progress.

As to drinking water quality, it complies with drinking water quality guideline issued by WHO. Specification of water source shows that degree of hardness in surface and ground water is geologically high and turbidity in surface water is less than 1 NTU in dry season and instantaneously more than 300 NTU in rainy season. It can be said that water is clear throughout the year.

Mentioning about human resource of DNSA, in the age of Indonesian rule, most of Timorese had been engaged in just miscellaneous tasks and Indonesian had managed everything. Therefore, after independence when Indonesian left RDTL, many staffs in DNSA have little technical skill for water supply system. Currently, many activities of rehabilitation of facility and non-revenue water are taken up to be implemented. So, Technical support is required for some time in the future.

3. Drinking water supply system in Dili

In the age of Indonesian rule, capital relocation was made from Baucau to Dili. Before the capital relocation, as just local city, drinking water supply system in Dili was small and covered small area where current presidential building was put. After the capital relocation, 3 water treatment plants (Bemos, Lahene, Benamauk) were constructed and distribution network was extended to meet increased water demand by economic and population growth. After independence from Indonesian rule in 2002, construction of Central water treatment plant (5000m^3/D), deep wells, reservoirs and rehabilitation of abandoned 3 water treatment plants were made by Japanese grant. Together with them, chemical sedimentation and

rapid sand filtration system for water treatment process was also put in place and further extension of distribution network by mainly DNSA was made. As a result of these activities, following system was achieved. (Indicators in 2012)

* Population served: 140,000
* Service rate: 54.5%
* Length of distribution network: 360km
* Service block: 10
* Distribution: Gravity fed piped system
* Connection: 11.000

Bemos Water Treatment Plant (2000m^3/d)

4. Problems with drinking water system in Dili

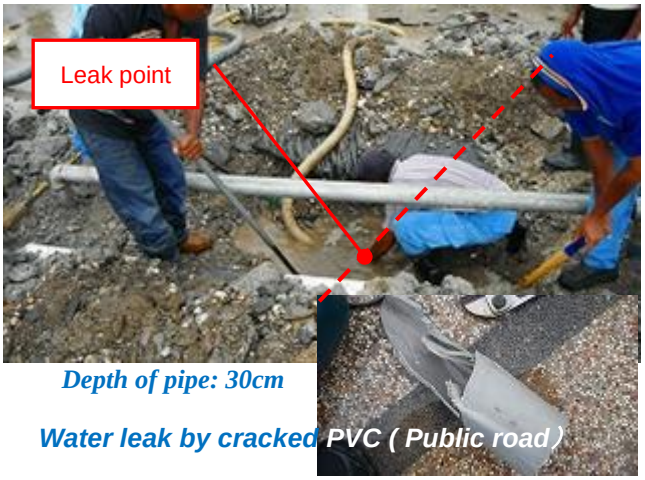
Actually, 24hours water supply in service area is not available even though production system was rehabilitated. The main reasons for that were found to be overlapped pipe, aged pipe, illegal connection, unimplemented block water supply and taps left open by customers. Following shows detail of problems.

4.1 Overlapped pipe

Distribution network in Dili is composed of several different pipelines which were installed in 3 generations. They were asbestos cement pipe (ACP) and steel pipe in the age of Portuguese, polyvinyl chloride pipe (PVC) and steal pipe in the age of Indonesia and ductile iron pipe and polyethylene pipe in the age of Timor Leste. All of them are still in use without removed and many of them are overlapping each other. This condition makes it difficult to find out the leaking pipe and increases water pressure loss by friction.

4.2 Aged pipe

Pipes installed in the age of Portuguese and Indonesia such as ACP, steel pipe and PVC are getting old and many leakages have occurred. And also, I can find the leakage from the damaged pipes caused by excessive weight from car traffic because pipes have been laid shallowly in the ground.

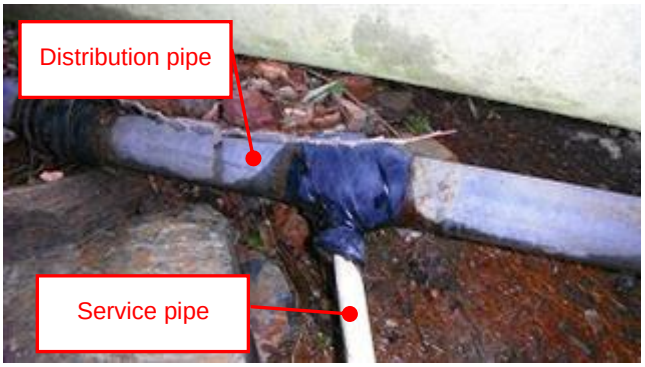


Depth of pipe: 30cm

Water leak by cracked PVC (Public road)

4.3 Illegal connection

Because there are shallow depth pipe installation and exposed pipe laying, it is easy to connect service pipe without a permission from DNSA. People who connect illegally to service pipe use water for their home as well as agriculture purpose. They do not use proper material for illegal connection. They just insert a rubber tube into DNSA's pipe and wind the rubber or cloth band around the pipe without using the corporation stop with saddle. Therefore water leaks happen

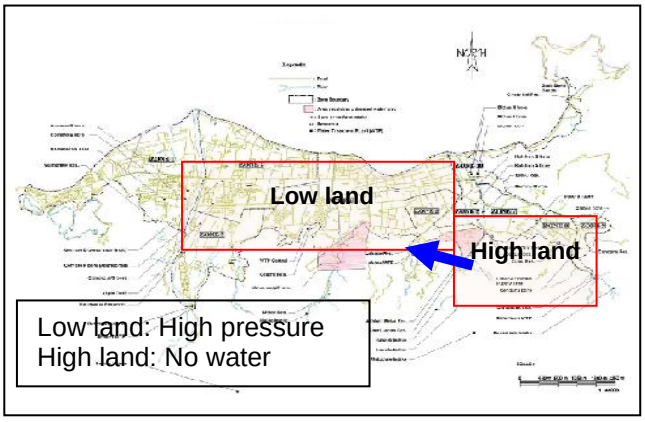


Illegal connection

frequently at the connection points.

4.4 Unimplemented block water supply

Water supply area in Dili is divided into 10 districts and is supposed to have been isolated physically according to the supply capacity, ground elevation, population and others. However, actually, this physical isolation does not work because there are unknown overlapping pipes and the boundary valves are not installed fully. So, pipes at high elevation districts have no water because water flows out to low land from high land.



4.5 Left taps open

Most of distributed water is not metered and water is no charge. Moreover, they do not know when water comes to their taps due to intermittent water supply. So many customers are leaving their taps open. And also, water is always flowing at the public taps because the taps are often taken away. The left tap open is regarded as water leak. It can be said that water leaks are happening at about 8,760 registered connections without water meter.

Public tap and stolen taps (Taken in Ainaro)

5. My responsibility and achievements

As water improvement adviser, I have been working for DNSA in Ministry of Public Works since April, 2012. My counterpart is director of DNSA. I am supposed to give a technical advice to DNSA for improving water supply system in RDTL. As my main achievements for distribution system, first of all, I identified pipe material and pipe size in the water distribution map of Dili. With using the map, I made an analysis on vulnerability in the system and I made suggestions to DNSA about needs for the immediate rehabilitation of the system, the district metering area and others. For production system, I upgraded the achievement given by the previous technical projects by JICA in terms of regular facility check, replacement of consumable parts, control of water quality responding to the change of current raw water quality and others. For the future, I will continue monitoring the above activities and try to transfer technology to DNSA's staffs exactly. Also I would like to advise the project setting up a pilot area where 24hours water supply is available.

6. Conclusion

For 24hours water supply in Dili, problems above must be solved step by step. DNSA has already created 5years action plan in 2013 and has been working on them. However, it seems that the plan is not progressing smoothly due to a lack of human resources and insufficient governmental procedure. I would like to do my best for a way that allows people of RDTL to access safe and sustainable water as soon as possible. (End)

<Report-2>

Thoughts on Human Resources Development

Katsutoshi Kagata
(former staff of Kitakyushu Waterworks Bureau)

The capacity building project for water supply system in Cambodia phase 1 and 2 were implemented for totally 8 years from 2003. The targeted waterworks in phase 1 was only Phnom Penh Water Supply Authority, but targeted waterworks in phase 2 (from April, 2007 to March, 2012) was expanded to 8 provincial waterworks. I was dispatched as a long term expert in the field of water treatment for the first two and a half years in this phase 2 project.

6 waterworks treatment plants of Battambang, Kampot, Kampong Cham, Kampong Thom, Pursat and Svay Rieng were rehabilitated by Asian Development Bank (ADB) in 2007, Sihanouk Ville by World Bank (WB) in 2004 and Siem Reap by Japanese ODA in 2006. Therefore, when the phase 2 project started in 2007, the provincial staffs had only small experience for the operation of those water treatment facilities. It was almost the first time for staff to operate water treatment facilities.

I carried out on the job training (OJT) with three steps. The first is about the basic theory, the second is instruction for actual operation then the last is setting up of operation procedure. On the instruction of actual operation, I carried out OJT about overall water treatment processes including water quality management, chemical dosing and operation of facilities. As a result they came to be able to perform appropriate water treatment to satisfy the Cambodian Drinking Water Quality Standard except the plant having the problem with facilities.

However, there are many problems to keep appropriate operation in developing countries. I got the opportunity to work as a short term expert at one of the provincial waterworks Siem Reap in this February approximately four years after the long-term expert activity. I'd like to state some points about current situation I noticed below.

- After the return home of the expert, the important part which was essential for water treatment process was carried out. For example, a periodical residual chlorine check of the tap water in town which was required for chlorine dosing control was carried out surely at Siem Reap waterworks. As a result, residual chlorine in town was kept securely.
- Knowledge about the water treatment is still insufficient. In order to get practical knowledge, not only the lecture but also many experiences that reached to a solution of the problem are necessary.
- One more problem is the transfer of the person in charge who received OJT and other training. The performance as the whole organization maybe increase, but if the operator does not receive sufficient training, the performance may decrease. I think that training of successor is very important issue.

Inspection of filter sand layer OJT in phase 2 (Battambang water treatment plant)

Residual chlorine measurement at tap in town every two weeks is continued after OJT in phase 2 (the left is the writer)

Watering plant before the sampling water (Siem Reap)

From the securing of residual chlorine of tap water in town, it can be said that they got the result of capacity building project surely. However, there are insufficient points about daily water quality management and water treatment, therefore a follow-up training is expected.

The activity of WaQuAC-NET will help the solution to these problems of capacity building. I hope that the members of the developing countries who will be able to share the experience and knowledge of the expert increase from now on.

Frank Chat by Anonymous-2

Red card to succession of technology in Japan !

I haven't seen you for a long time!

It is first time in four years for us to gather here.

During the time, one project has finished, indeed.

By the way, recently, I have visited country M. And I observed a training of O&M in an infra-project. There, counterparts of country M and Japanese young people had taken the training together. Really! Japanese young people go to country M to acquire the technology, not teach the technology. It seems so. Who is the lecturer?

Japanese senior expert did. Does it mean he can go to developing countries for teaching technology but cannot teach young people in Japan? Yes, young people have no chance to learn technology by OJT in Japan.

Technology succession system is something wrong in Japan! I think water supply field also has a same situation. Someone working in water utility said purpose of international cooperation is for capacity building of the staffs

Reason why technology cannot be succeeded is Japan finished period of expanding facilities and infrastructures and then young engineers cannot experience big project, or no experienced engineers after retiring baby boomers, or water utilities contract to private companies and technology moved from the utilities to private companies, or no time to learn technology in order to personnel cut. Well, I remember a top of water utility talked in a magazine, "Concession of water supply management to private company does not mean technology moves to private company. Technology is succeeded to the organization which has responsibility in work (technology) Saying conversely, the utility cannot succeed the technology, because it doesn't have responsibility in technology.

It is important for young person to go to abroad and study, isn't it? Do you divert from issue !.

Let's talk differences between development of water supply in Africa and one in Asia! *Daisuke SAKAMOTO*

(Interested? Contact WaQuAC-NET Office!)

Introduction of New Members

- **Mr. Hiroto Oda (Japan)**
- **Mr. Yasuhiko Morita (Japan)**
- **Ms. Ryoko Mizuyori (Japan)**
- **Mr. Hidetake Aoki (Japan)**

◎ We welcome new members anytime ◎
Please contact us

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