

Solve the problem of less than 24hours water supply



7-30

Find the cause of LT24hrs

2

- 1) Low water pressure
→ Replacement to High-head pump
- 2) Small pipe diameter
→ Replacement to large pipeline
- 3) Much water consumption
→ Partition / Arrangement of supply area
- 4) Wide supply area
→ Partition / Arrangement of supply area
- 5) Power failure
→ Gravity water flow via elevated tank
- 6) Water suspension by construction
→ Backup system, Loop pipe

Water Supply Designing

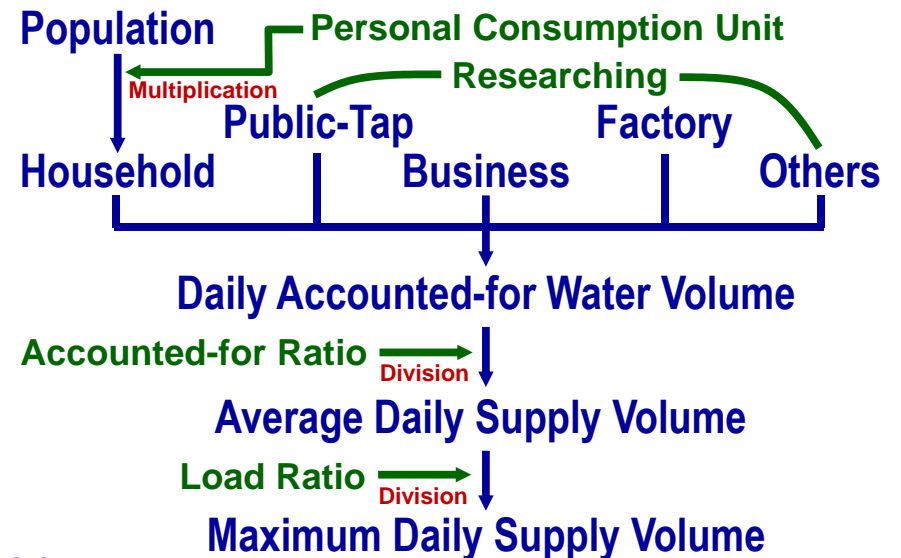
Decision of related matters of supply volume

3

1. Population in supply area for target year
2. Decision of water consumption per capita
3. Prediction of leakage rate and the others
4. Setting of Load ratio
5. Water transmission capacity from WTP and wells

Water Supply Designing

4



Replacement to New

5

Replacement to High-head
powerful pump

Replacement from small to
large pipe

→ Easy solution!!

But high cost, need yearly plan

Supply Area Partition

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Aggregation of some DMA

Reorganization of divided DMA

Backup between DMA and DMA

→ Need Pipeline network
calculation

→ More, Need pipeline and
other construction

Gravity Water Supply

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Non water suspension → 24hrs

→ Need more well pumping
power and/or facility

→ Need additional Pipeline
network

→ Tank capacity: how long
hours, how volume?



 Yokohama Water

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KEN Yokoyama

Introduction of Japanese Performance Indicators (PIs) and YWWB situation

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Contents

1. Record, Results, Analysis, Value
2. What is Performance Indicators? Familiar Digitizing and Evaluation
3. PIs for Water supply business JWWA Q100, ISO24510/12 Try to absorb some PIs in your city
4. Conclusion

NBA Player of SSD

Famous SSD Basketball Player

Manute Bol / NBA: 1985 – 94

624 games	18.7 minutes/g
1,599 points	2.6 points/g
2,647 rebounds	4.2 rebounds/g
2,086 blocks	3.3 blocks/g (2 nd)



Luol Deng / NBA: 2004 –

	04-05	05-06	06-07	07-08	08-09	09-10	10-11	Career
Game	61	78	<u>82</u>	63	49	70	<u>82</u>	485
Points	11.7	14.3	<u>18.8</u>	17.0	14.1	17.6	17.4	16.0
Rebounds	5.3	6.6	7.1	6.3	6.0	<u>7.3</u>	5.8	6.4
Assists	2.2	1.9	2.5	2.5	1.9	2.0	<u>2.8</u>	2.3
Field goal %	43.4	46.3	<u>51.7</u>	47.9	44.8	46.6	46.0	47.1



PI in your life

Do you use PI in your life?

Engel's coefficient

$$= \frac{\text{Food expenses (JPY)}}{\text{Consumer spending (JPY)}} \times 100 (\%)$$

= 23.2% in 2008 (Japanese Average)

BMI: Body Mass Index (for adult)

$$= \frac{\text{Weight (kg)}}{\text{Height (m)} \times \text{Height (m)}}$$

= 18.5 – 25.0 (Standard range)

What is PI?

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What is PI (Performance Indicator)?

- PI is some of the assessment criteria to water supply service consumers.
- PI should be used to assess the performance of the service against the objectives set in accordance with consumers' needs and expectations.

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Japanese PI; JWWA Q100

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Service Assessment

A drinking water supply service is required to satisfy consumer needs. But, we cannot be easily described.



It is crucial to assess drinking water supply service from various points of view and quantitatively.

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Japanese 137 PIs

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Concept of PIs

PIs are used to measure from quantity the results of performance of water utility achieve the objectives and to improve the quantity of water supply service.

JWWA standardization was on 2005.

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Japanese 137 PIs

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Each PI should ...

- be clearly defined in accordance with objectives;
- be with a concise meaning and univocal;
- be assessed from variables that can be easily measurable at a reasonable cost;
- allow for clear comparison with targeted objectives and simplify an otherwise complex analysis;
- be auditable, simple and easy to understand;
- be avoid any personal or subjective appraisal.

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Japanese 137 PIs

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Relation between purposes and PI

1. Reliability - Water resource, Water quality management	22
2. Stability - Preparation for future, Risk management	33
3. Sustainability - Business Reinforcement, Improvement of service	49
4. Environment - Prevention of global warming	7
5. Management - Appropriate Operation and Maintenance	24
6. International Cooperation	2

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PIs for Water Business

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1001	1002	1003	1004	1005	1101	1102	1103	1104	1105	1. Reliability
1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	
1116	1117	2001	2002	2003	2004	2005	2006	2007	2008	2. Stability
2101	2102	2103	2104	2105	2106	2107	2201	2202	2203	
2204	2205	2206	2207	2208	2209	2210	2211	2212	2203	3. Sustainability
2214	2215	2216	2217	2218	3001	3002	3003	3004	3005	
3006	3007	3008	3009	3010	3011	3012	3013	3014	3015	4. Environment
3016	3017	3018	3019	3020	3021	3022	3023	3024	3025	
3026	3027	3101	3102	3103	3104	3105	3106	3107	3108	5. Management
3109	3110	3111	3112	3201	3202	3203	3204	3205	3206	
3207	3208	3209	3210	4001	4002	4003	4004	4005	4006	6. Int'l Coop
4101	5001	5002	5003	5004	5005	5006	5007	5008	5009	
5101	5102	5103	5104	5105	5106	5107	5108	5109	5110	
5111	5112	5113	5114	5115	6001	6101				

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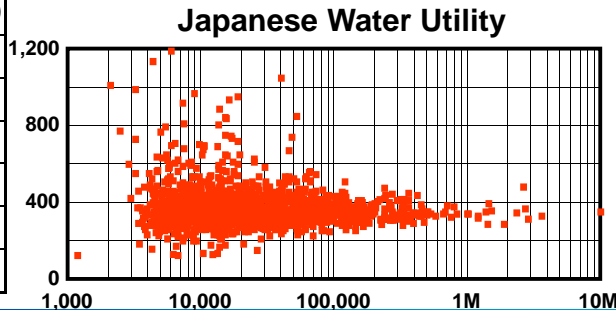
PIs for Water Business

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Stable supply of water at anytime
2002 Transmission input per population supplied (L/person/day)

$$PI = \frac{\text{Average daily transmission input} \times 1,000 \text{ (L)}}{\text{Service population (person)}}$$

	YWWB	MCWD
2004	341	
2005	339	
2006	333	
2007	329	
2008	326	
2009	323	



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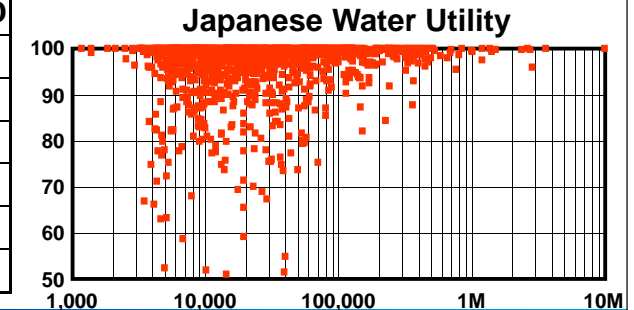
PIs for Water Business

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Stable supply of water at anytime
2006 Population served by water supply (%)

$$PI = \frac{\text{Service population (person)}}{\text{Service area population (person)}} \times 100$$

	YWWB	MCWD
2004	100	
2005	100	
2006	100	
2007	100	
2008	100	
2009	100	



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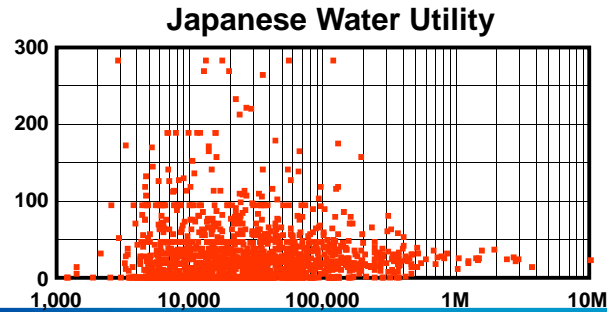
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Stable supply of water at anytime

2211 Chemicals stock (day)

$$PI = \frac{\text{Average chemical stock (ton or kL)}}{\text{Daily consumption (ton or kL / day)}}$$

	YWWB	MCWD
2004	16.4	
2005	14.4	
2006	14.4	
2007	14.1	
2008	19.8	
2009	27.6	



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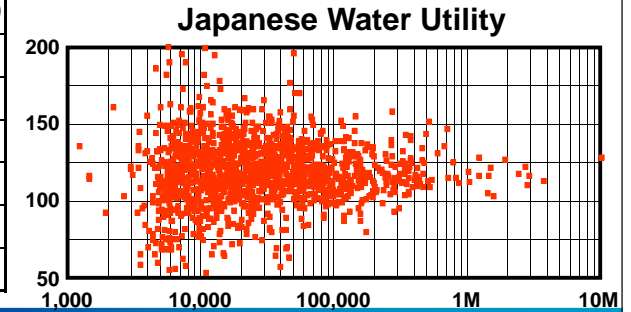
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Sustainable and stable supply

3001 Operating ratio (%)

$$PI = \frac{\text{Operating income (JPY)}}{\text{Operating expenses (JPY)}} \times 100$$

	YWWB	MCWD
2004	113.7	
2005	112.9	
2006	114.0	
2007	112.4	
2008	112.4	
2009	110.5	



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PIs for Water Business

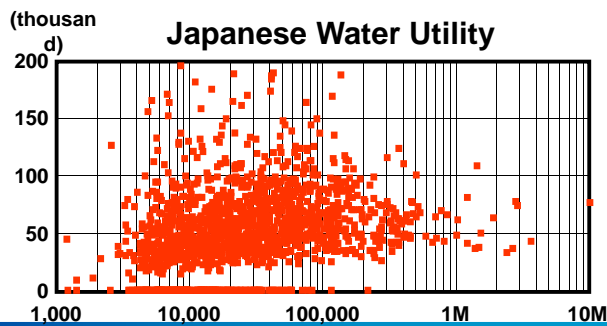
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Sustainable and stable supply

3007 Revenue on water sales per personnel (1,000yen/person)

$$PI = \frac{\text{Water supply revenue / 1,000 (yen)}}{\text{Staff members (person)}}$$

	YWWB	MCWD
2004	36,782	
2005	38,389	
2006	40,048	
2007	42,702	
2008	45,498	
2009	46,693	



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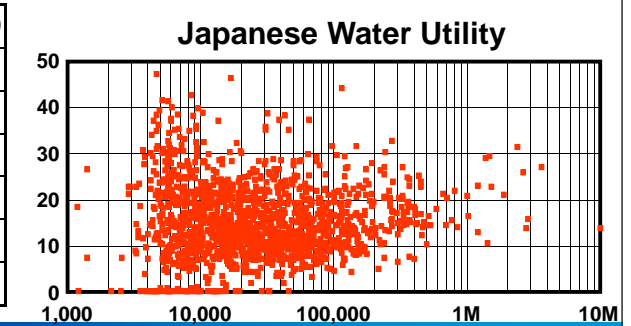
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Sustainable and stable supply

3008 Ratio of personnel salary costs for revenue on water sales (%)

$$PI = \frac{\text{Labor cost (yen)}}{\text{Water supply revenue (yen)}} \times 100$$

	YWWB	MCWD
2004	29.3	
2005	29.2	
2006	27.3	
2007	26.1	
2008	24.9	
2009	24.3	



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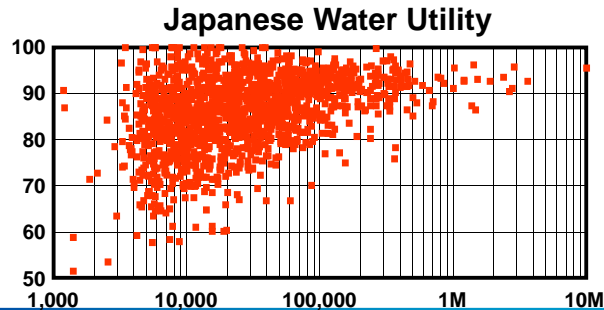
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Stable supply of water at anytime

3018 Revenue water ratio (%)

$$PI = \frac{\text{Revenue water volume (m}^3\text{)}}{\text{Supply volume (m}^3\text{)}} \times 100$$

	YWWB	MCWD
2004	92.1	
2005	91.1	
2006	92.0	
2007	92.6	
2008	92.0	
2009	91.5	



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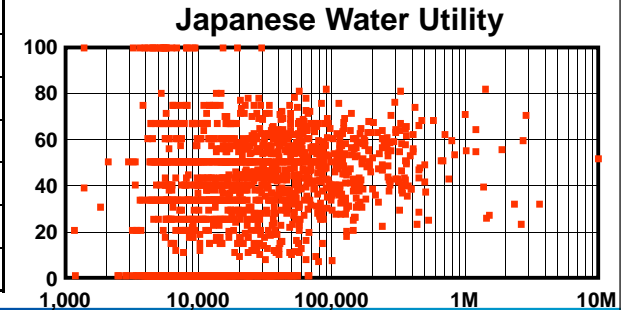
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Stable supply of water at anytime

3105 Technical employees ratio (%)

$$PI = \frac{\text{Number of engineers (person)}}{\text{Total number of staff (person)}} \times 100$$

	YWWB	MCWD
2004	25.6	
2005	26.5	
2006	27.2	
2007	32.1	
2008	33.4	
2009	35.5	



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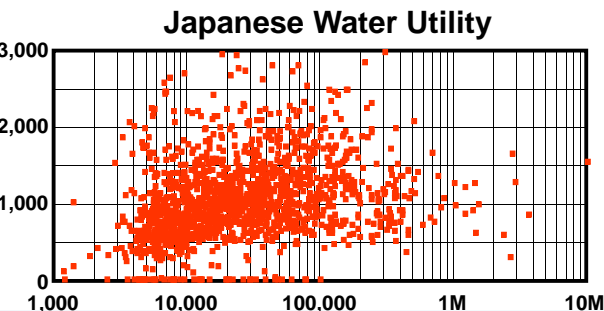
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Stable supply of water at anytime

3110 Number of meters per employee (No./person)

$$PI = \frac{\text{Number of water meters (No.)}}{\text{Total number of staff (person)}}$$

	YWWB	MCWD
2004	719	
2005	759	
2006	812	
2007	844	
2008	910	
2009	976	



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PIs for Water Business

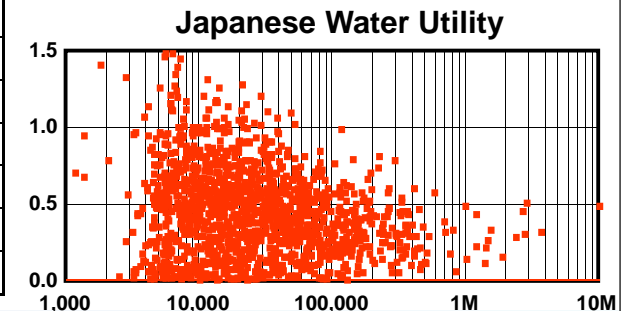
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Environmental protection

4001 Electric power consumption per 1m³ transmission input (kWh/m³)

$$PI = \frac{\text{Total power consumption (kWh)}}{\text{Annual transmission input (m}^3\text{)}}$$

	YWWB	MCWD
2004	0.35	
2005	0.34	
2006	0.33	
2007	0.32	
2008	0.32	
2009	0.31	



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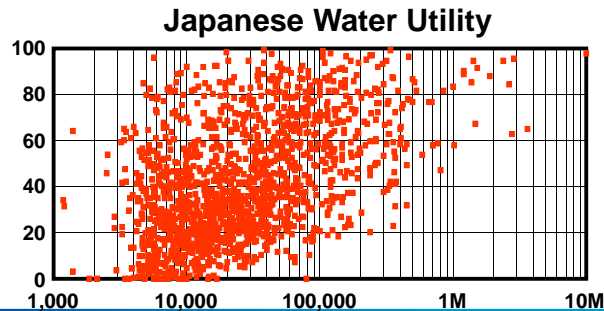
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Appropriate O&M of supply systems

5102 Ratio of ductile iron and steel pipe (%)

$$PI = \frac{\text{Length of DIP and SP (km)}}{\text{Total pipeline length (km)}} \times 100$$

	YWWB	MCWD
2004	79.3	
2005	80.1	
2006	80.9	
2007	81.5	
2008	82.4	
2009	82.6	



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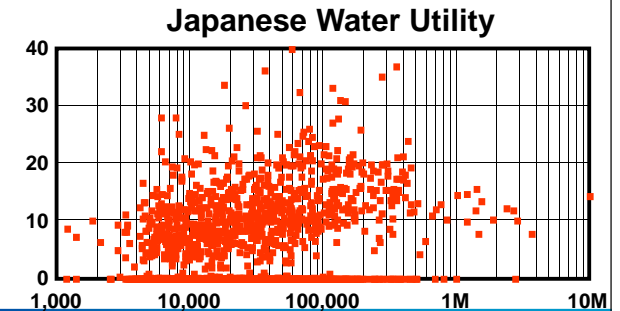
22

Stable supply of water at anytime

5112 Valve density (No./km)

$$PI = \frac{\text{Number of valves (No.)}}{\text{Total pipeline length (km)}}$$

	YWWB	MCWD
2004	7.6	
2005	7.7	
2006	7.7	
2007	7.8	
2008	7.9	
2009	7.9	



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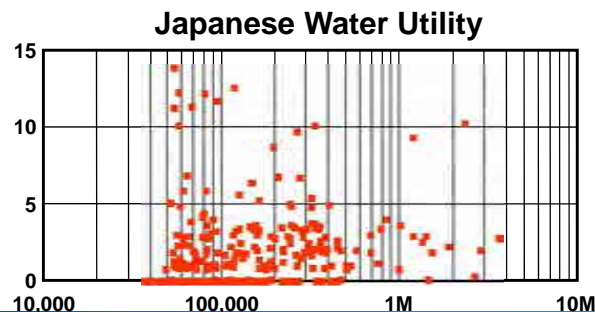
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Improvement of CS of user needs

3201 Ratio of water service information to public

$$PI = \frac{\text{Number of to public information (No.)}}{\text{Number of service connections (No.)}}$$

	YWWB	MCWD
2004	3.8	
2005	3.8	
2006	2.8	
2007	2.7	
2008	2.7	
2009	2.7	



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PIs for Water Business

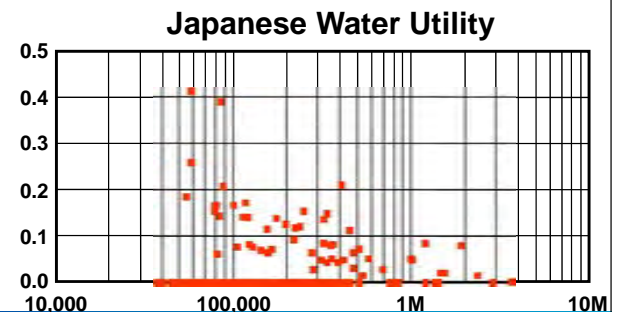
24

Improvement of CS of user needs

3202 Number of monitors

$$PI = \frac{\text{Number of monitors (person)}}{\text{Service population (person)}} \times 1,000$$

	YWWB	MCWD
2004	0.014	
2005	0.014	
2006	0.014	
2007	0.029	
2008	0.026	
2009	0.000	



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PIs for Water Business

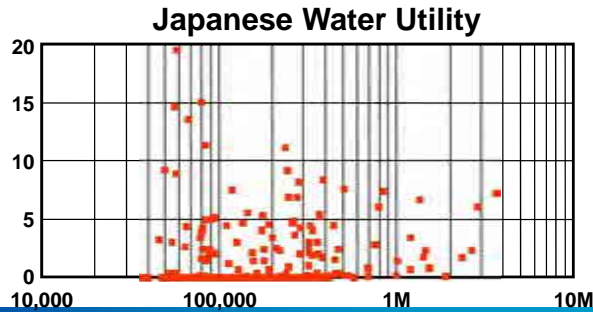
25

Improvement of CS of user needs

3203 Information gathering by questionnaire

$$PI = \frac{\text{Number of answers (person)}}{\text{Service population (person)}} \times 1,000$$

	YWWB	MCWD
2004	5.60	
2005	5.60	
2006	5.87	
2007	4.49	
2008	3.75	
2009	7.13	



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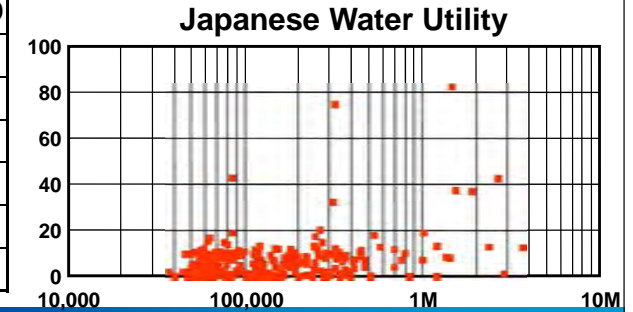
26

Improvement of CS of user needs

3204 Visitors to water supply facilities

$$PI = \frac{\text{Number of visitors (person)}}{\text{Service population (person)}} \times 1,000$$

	YWWB	MCWD
2004	6.8	
2005	6.8	
2006	6.2	
2007	11.7	
2008	12.4	
2009	12.4	



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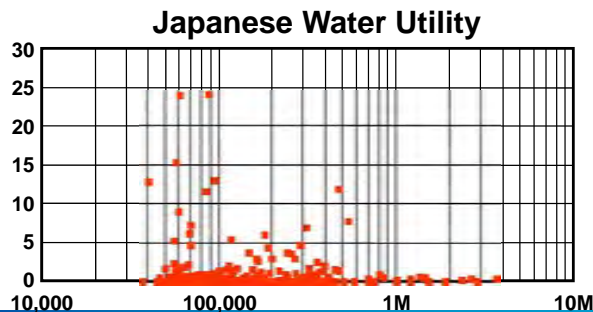
27

Improvement of CS of user needs

3205 Water supply service complaints

$$PI = \frac{\text{No. of complaints of services}}{\text{No. of service connections}} \times 1,000$$

	YWWB	MCWD
2004	0.35	
2005	0.35	
2006	0.57	
2007	0.35	
2008	0.35	
2009	0.44	



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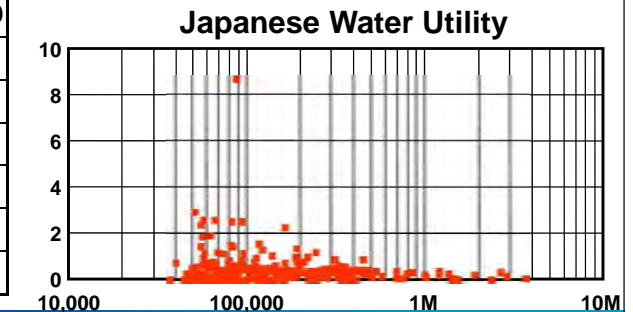
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Improvement of CS of user needs

3206 Complaints for water quality

$$PI = \frac{\text{No. of complaints about quality}}{\text{No. of service connections}} \times 1,000$$

	YWWB	MCWD
2004	0.02	
2005	0.02	
2006	0.03	
2007	0.03	
2008	0.03	
2009	0.01	



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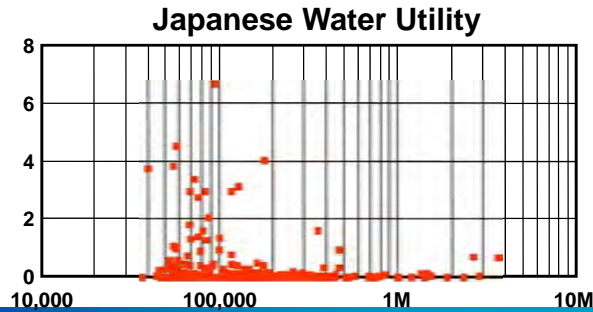
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Improvement of CS of user needs

3207 Billing complaints for water supply

$$PI = \frac{\text{No. of complaints about tariff}}{\text{No. of service connections}} \times 1,000$$

	YWWB	MCWD
2004	0.467	
2005	0.457	
2006	0.298	
2007	0.398	
2008	0.396	
2009	0.236	



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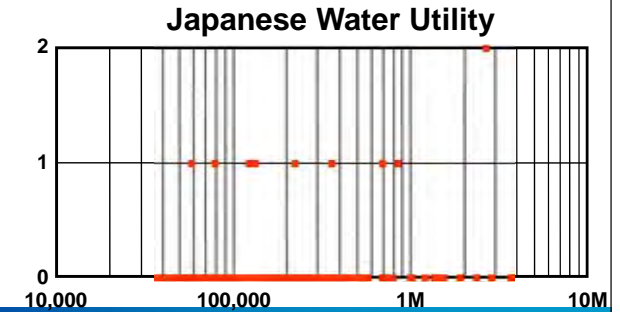
30

Improvement of CS of user needs

3208 Number of audit request

$$PI = \text{Number of audit requests per year}$$

	YWWB	MCWD
2004	0	
2005	0	
2006	0	
2007	0	
2008	0	
2009	0	



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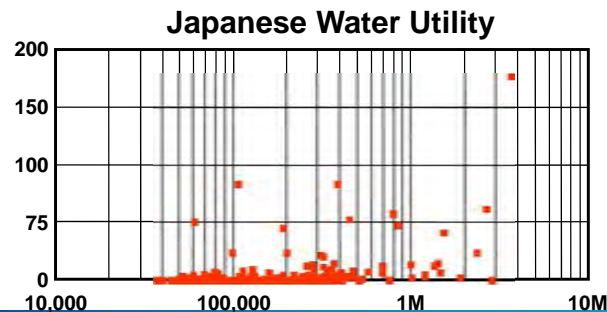
31

Improvement of CS of user needs

3209 Number of requests for information disclosure

$$PI = \text{Number of information disclosure requests per year}$$

	YWWB	MCWD
2004	40	
2005	36	
2006	43	
2007	95	
2008	295	
2009	176	



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PIs for Water Business

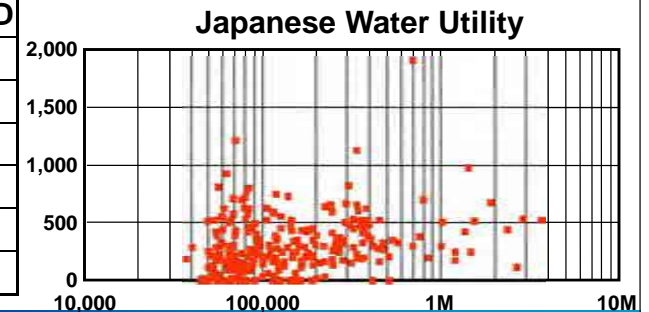
32

Improvement of CS of user needs

3210 Number of reception per employee

$$PI = \frac{\text{Number of applications (No.)}}{\text{Total number of staff (person)}}$$

	YWWB	MCWD
2004	398	
2005	396	
2006	352	
2007	425	
2008	472	
2009	505	



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PIs for Water Business

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ISO24510: International Standard

Adopted by IWA (2003, 2006)
ANFOR (FRA, 2000)
JWWA (JPN, 2005)
AWWA (USA, 2005)

P45: Annex B / 36 sample PIs

I_{QS12}: Continuity of supply (%)
I_{QS23}: New connection efficiency (day)
I_{QS28}: Water pressure complaints (%)
I_{QS30}: Water quality complaints (%)

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PIs for Water Business

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ISO24510: International Standard

P45: Annex B / 36 sample PIs

B.3.9.2: Distance from water point to household (m)
B.4.2: Billing complaints and queries (no./cust./year)
B.4.5: Distance from payment point to household (m)
B.5.2: Response to written complaints (%)
B.5.3: Telephone contacts answered on time (%)
B.5.4: User visits to water utility assisted on time (%)
B.5.6: Complaints and requests resolved on time (%)
B.5.8: Coverage of service information (%)

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7.2 現地業務日程(第1次～第4次現地業務)

第1次現地業務 2012年 3月11日(日)～ 3月24日(土) (14日間)

第2次現地業務 2012年 6月12日(火)～ 6月30日(土) (19日間)

第3次現地業務 2012年10月14日(日)～11月 1日(木) (19日間)

第4次現地業務 2013年 2月 3日(日)～ 2月23日(土) (21日間)

Technical Assistance on Water Supply Operation and Management for Metropolitan Cebu Water District: The first field operation

Date: March 11(Sun) - March 24(Sat), 2012 14 days

Day	Date	Activity: AM	Activity: PM	Stay
1	Mar.11 (Sun)	Transfer from Tokyo to Cebu PR433 NRT/1425(JPT) - CEB/1845		Cebu
2	Mar.12 (Mon)	Kick off meeting with MCWD (Explanation of Inception Report) @MCWD	Discuss with MCWD's C/P about Distribution and Water Treatment @MCWD	Cebu
3	Mar.13 (Tue)	Discuss with MCWD's C/P about Water Treatment and Water Quality @MCWD	Discuss with MCWD's C/P about Business management, Customer Service and GIS, Mapping system @MCWD	Cebu
4	Mar.14 (Wed)	Field Survey @Buhisan Dam, Tisa Water Filter Plant (Water Treatment Plant)	Field Survey @Groundwater dilution points, Fe/Mn removal verification plant, Planning Site of Leakage Training Yard	Cebu
5	Mar.15 (Thu)	Field Survey to Less than 24 hours water supply area (Mountain side)	Field Survey to Much leakage DMA areas (flat area)	Cebu
6	Mar.16 (Fri)	Confirmation of Field survey / Select of pilot DMAs (Distribution system) @MCWDHQ	Confirmation of Field survey / Grasp of problem of Tisa / Decision of demonstraion of Buhisan inlet valve condition @MCWDHQ	Cebu
7	Mar.17 (Sat)		Inspection of prearranged construction site	Cebu
8	Mar.18 (Sun)			Cebu
9	Mar.19 (Mon)	Confirmation of Field survey about Water Quality @Water Quality (Talamban)	Preparation of next day's Jar-test demonstration / GIS & Mapping / Leakage office @Water Quality (Talamban)	Cebu
10	Mar.20 (Tue)	Demonstration of Buhisan inlet valve operation @Tisa Filter Plant	Demonstration of Jar-test and Backwashing operation @Tisa Filter Plant	Cebu
11	Mar.21 (Wed)	Discussion and Team meeting @MCWD	Discussion and Team meeting @MCWD	Cebu
12	Mar.22 (Thu)	Report to MCWD @MCWD	Discussion with MCWD @MCWD	Cebu
13	Mar.23 (Fri)	Transfer from Cebu to Manila PR848: CEB/0905 - MNL/1020	Report to JICA Philippine Office	Manila
14	Mar.24 (Sat)	Team meeting @Hotel	Departure from Manila PR432: MNL/1450 - NRT/2010(JPT)	—

Technical Assistance on Water Supply Operation and Management for Metropolitan Cebu Water District: The second field operation

Date: June 12 (Tue) - June 30 (Sat), 2012 19 days

Day	Date	Activities	Stay
1	Jun.12 (Tue)	[C] Transfer from Tokyo to Cebu PR433 NRT/1430(JPT) - CEB/1825	Cebu
2	Jun.13 (Wed)	AM [C] Kick off meeting with MCWD (Explanation of 2nd Field Operation) @MCWD	Cebu
		PM [D/L/Q/P/S] Discuss with C/P about Distribution system / Leakage Management @MCWD [M/T] Discuss with C/P about Confirming the topics @MCWD	
3	Jun.14 (Thu)	AM [Q/P] Discuss with C/P about Water Treatment @MCWD Talamban > MCWD [M/D] Discuss with C/P - confirm the schedule @MCWD [L/T/S] Preparation of Field survey @MCWD Talamban >> Fish Market (Leakage point) >> MCWD	Cebu
		PM [C] Field survey to Tisa WTP / G5B-G4 Dilution area / Less Than 24hrs area / DMA 25A&B / W34 Fe&Mn Removal Plant @In the city	
4	Jun.15 (Fri)	AM [Q/P] Discuss with C/P about Water Quality @MCWD Talamban BO [M/T] Discuss with C/P about Customer's way of paying water charge, Customer Service, PR @MCWD [L/D/S] Field survey around DMA 25A&B area and other @In the city	Cebu
		PM [Q/P] Discuss with C/P about Water Quality @MCWD Talamban BO [M/T] Field survey to Place of Customer's payment (Headquarter, Department store) @MCWD >> In the city [L/D/S] Field survey around DMA 25A&B area and other @In the city	
5	Jun.16 (Sat)	[C] Join to MCWD Sports Festival as Guest / Watch about MCWD's Family Service	Cebu
6	Jun.17 (Sun)	[C] PT meeting	Cebu
7	Jun.18 (Mon)	AM [P/Q] Measurement of Tisa inlet flow volume by USFM / Confirmation of structure of Sedimentation basin @MCWD >> Tisa WTP [L/S] Field survey planning @MCWD >> In the city [M] Field survey to Private company (Competitor) / Hearing from customer / Discuss with Business management, Customer Service, PR @MCWD >> In the city [T/D/K] Courtesy call to MCWD / Hearing from Mapping staffs @MCWD	Cebu
		PM [P/Q] Survey of Backwashing condition / Survey of surface condition of Filter basin @Tisa WTP >> MCWD [L/S] Field survey around DMA 25A&B area @In the city [M/T] Field survey to Private company (Competitor) / Hearing from customer / Discuss with Business management, Customer Service, PR @In the city [D/K] Hearing from Hydrostatics staffs @Talamban BO	
8	Jun.19 (Tue)	AM [C] One Day Seminar @MCWD	Cebu
		PM [K/S] Discuss with Mapping Staff after KKC's Presentation @MCWD >> Talamban BO	

Day	Date	Activities	Stay
9	Jun.20 (Wed)	AM [M/T] Join the Seminar for New Connection Customer @MCWD [P/Q] Measurement of Tisa inlet flow volume by USFM / Survey of Backwashing condition & Measurement of Backwashing flow volume @Tisa WTP [L/S] Field survey around DMA 25A&B area @In the city [D/K] Hearing from Mapping and Hydrostatics staffs @MCWD	Cebu
		PM [M/T] Field survey and hearing from Water Meter Reader @MCWD > In the city [P/Q] Measure of the elevation of treatment facilities @Tisa WTP [L/S] Field survey around DMA 25A&B area and Consolacion city @In the city [D/K] Reporting to MCWD about Research result of Mapping and GIS system of MCWD @MCWD	
10	Jun.21 (Thu)	AM [M/T] Discuss with C/P about PR, Business management, Customer Service @MCWD [P/Q] Backwashing pattern attempton @Tisa WTP [L/D/S] Field survey around Lapu-lapu city area @In the city	Cebu
		PM [M/T] Discuss with C/P about PR, Business management, Customer Service @MCWD [P/Q] Measurement of coagurant injection volume & Measurement of recieving well @Tisa WTP >> MCWD [L/D/S] Discuss with C/P about survey of model block area @MCWD	
11	Jun.22 (Fri)	AM [M/T] Discuss with C/P about PR and CS / Preparing of Presentation Report for MCWD @MCWD [P/Q/D/L/S] Survey of pipeline location in Tisa WTP @MCWD >> Tisa WTP	Cebu
		PM [P/Q] Measurement of inlet flow volume by USFM @Tisa WTP [M/T/D] Report to MCWD @MCWD [T/L/D/S] Discuss with C/P about survey of model area / Measuring of Minimum Night Flow Measurment from night to dawn @MCWD >> In the city	
12	Jun.23 (Sat)	PT meeting [M] PR848: CEB/0905 - MNL/1020 PR432: MNL/1450 - NRT/2010(JPT)	Cebu
13	Jun.24 (Sun)	PT meeting	Cebu
14	Jun.25 (Mon)	AM [P/Q/T] Study of Baffling equipment introduction @MCWD Talamban BO [L/D/S] Discuss with C/P about construction place, method and materials @MCWD Talamban BO	Cebu
		PM [P/Q] Study of Baffling equipment introduction @MCWD Talamban BO [T/L/D/S] Discuss about construction place, method and materials @MCWD	
15	Jun.26 (Tue)	AM [C] Study of Baffling equipmenr introduction and Rehabilitation work for rapid sand filiter @Tisa WTP	Cebu
		PM [C] Discuss with C/P about hydraulic calculation around Less than 24 hours water supply area / Confirm construction site @In the city (DMA 16/20/25A)	
16	Jun.27 (Wed)	AM [C] Team meeting / Making report materials @MCWD	Cebu
		PM	
17	Jun.28 (Thu)	AM [C] Report to MCWD @MCWD	Cebu
		PM [C] Discussion with MCWD @MCWD	

Day	Date		Activities	Stay
18	Jun.29 (Fri)	AM	Departure from Manila/Cebu [L/P] PR434: CEB/0850 - NRT/1330(JPT) [T/D/Q] PR848: CEB/0905 - MNL/1020	Manila
		PM	[C] Report to JICA Philippine Office	
19	Jun.30 (Sat)		Departure from Manila [C] PR432: MNL/1450 - NRT/2010(JPT)	—

"BO" means Talamban Branch Office.

"PT" means JICA Project Team.

Mark [C] means the common activity, [T]: Team Leader, [M]: Business Management, [P]: Water Treatment (Purification), [Q]: Water Quality Management, [L]: Leakage Prevention, [D]: Distribution System, [S]: Support Engineering Staff, [K]: Kokusai Kogyo Company

Technical Assistance on Water Supply Operation and Management for Metropolitan Cebu Water District: The third field operation

Date: October 14 (Sun) - November 1 (Thu), 2012 19 days

Day	Date	Activities	Stay
1	Oct.14 (Sun)	[C] Transfer from Tokyo to Cebu PR433 NRT/1430(JPT) - CEB/1825 Airport >> Hotel	Cebu
2	Oct.15 (Mon)	AM [C] Kick off meeting with MCWD (Explanation of 3rd Field Operation) @MCWD Hotel >> MCWD	Cebu
		PM [C] Discuss with C/P about results of both assignments / Confirm schedule @MCWD MCWD >> Hotel	
3	Oct.16 (Tue)	AM [C] Discuss and with C/P about Water Treatment / Field operation work / Pipe Storage @Talamban/ Tisa Hotel >> Talamban >> Tisa WTP >> MCWD	Cebu
		PM [C] Discuss with C/P about Distribution and Leakage / Field operation work @MCWD MCWD >> Hotel	
4	Oct.17 (Wed)	AM [TQP] Discuss and Experiment about slow mixing facility in sedimentation @Tisa [LDS] Discuss about Leakage survey plan @MCWD [C] Hotel >> [LDS] MCWD >> [TQP] Tisa	Cebu
		PM [TQP] Discuss and Experiment about slow mixing facility in sedimentation @Tisa [LDS] Discuss about Leakage survey plan @MCWD [TQP] Tisa >> MCWD >> [C] Hotel	
5	Oct.18 (Thu)	AM [TQP] Inspection of Jaclupan @Jaclupan [LS] Discuss about Leakage survey plan @MCWD [D] Discuss about Distribution Block (Less than 24 hours) @MCWD [C] Hotel >> [LDS] MCWD >> [TQP] Jaclupan >> [TQP] Tisa	Cebu
		PM [TQP] Discuss new component of the rapid sand filter @Tisa [LS] Discuss about Leakage survey plan @MCWD [D] Discuss about Distribution Block (Less than 24 hours) @MCWD [TQP] Tisa >> MCWD >> [C] Hotel	
6	Oct.19 (Fri)	AM [TQP] Experiment of removal Iron/Manganese @W34/W35 [LS] Discuss about Leakage survey plan @MCWD [D] Discuss about Distribution Block (Backup) @MCWD [C] Hotel >> [LDS] MCWD >> [TQP] W34/W35 >> Talamban	Cebu
		PM [TQP] Discuss removal of Iron/Manganese @Talamban [LS] Discuss about Leakage survey plan @MCWD [D] Discuss about Distribution Block (Backup) @MCWD [TQP] Talamban >> MCWD >> [C] Hotel	
7	Oct.20 (Sat)	[TDL] Meeting about DMA25 pipe replacing @MCWD [QP] Manufacturing of Baffling plate @Tisa	Cebu
8	Oct. 21 (Sun)	[TDL] Meeting about DMA25 pipe replacing @MCWD [QP] Manufacturing of Baffling plate @Tisa	Cebu
9	Oct.22 (Mon)	AM [TQP] Measurement of Inlet flow rate of Tisa @Tisa [LS] Discuss about Leakage survey plan @MCWD [D] Discuss about transfer of skill and know-how @MCWD [C] Hotel >> [LDS] MCWD >> [TQP] Tisa	Cebu
		PM [TQP] Measurement of flow rate in distribution @City [LS] Discuss about Leakage survey plan @MCWD [D] Discuss about business evaluation using PI @MCWD [TQP] Tisa >> City >> MCWD >> [C] Hotel	

Day	Date	Activities	Stay
10	Oct.23 (Tue)	AM [QP] Measurement of flow rate at Buhisan Dam @Buhisan Dam [TLS] Discuss about Pipe rehabilitation (replacement) plan @MCWD [D] Discuss about transfer of skill and know-how @MCWD [C] Hotel >> [TLDS] MCWD >> [QP] Buhisan Dam >> Talamban	Cebu
		PM [QP] Discuss removal Iron/Manganese and high Nitrate @Talamban [TLS] Discuss about Pipe rehabilitation (replacement) plan @MCWD [D] Discuss about business evaluation using PI @MCWD [QP] Talamban >> MCWD >> [C] Hotel	
11	Oct.24 (Wed)	AM [QP] Experiment of removal Iron/Manganese @W34/W35 [LS] Discuss about Pipe rehabilitation (replacement) plan @MCWD [T] Discuss about Mapping system @MCWD [D] Discuss about Distribution Block (Less than 24 hours) @MCWD [C] Hotel >> [TLDS] MCWD >> [QP] W34/W35	Cebu
		PM [QP] Experiment of removal Iron/Manganese @W34/W35 [LS] Discuss about Pipe rehabilitation (replacement) plan @MCWD [T] Discuss about Mapping system @MCWD [D] Discuss about Distribution Block (Backup) @MCWD [QP] Talamban/W34 >> [TLDS] MCWD >> [C]Hotel	
12	Oct.25 (Thu)	AM [QP] Discuss with C/P about Water Treatment @Tisa / Talamban [LDS] Discuss about Pipeline Training Facilities @Tisa [C] Hotel >> [C] Tisa >> [TLDS] MCWD >> [QP] Talamban	Cebu
		PM [QP] Discuss with C/P about Water Treatment @Talamban DMA25A Pipeline construction / Process management of construction @MCWD [T] Discuss about Mapping system @MCWD [QP] Talamban >> [TLDS] MCWD >> [C]Hotel	
13	Oct.26 (Fri)	AM [C] Making report materials / Project Team Meeting with MCWD CPs @MCWD	Cebu
PM			
14	Oct.27 (Sat)	[C] Making report materials / Project Team Meeting / Check Baffling plates and Filter sand rehabilitation @MCWD / Tisa WTP	Cebu
15	Oct.28 (Sun)	[C] Making report materials / Project Team Meeting / Check Baffling plates and Filter sand rehabilitation @MCWD / Tisa WTP	Cebu
16	Oct.29 (Mon)	AM [TQP] Discuss with C/P about Water Treatment @MCWD [LDS] Discuss with C/P about Distribution and Leakage @Tisa / MCWD [C] Hotel >> [TLDS] MCWD >> [QP] Tisa >> MCWD	Cebu
		PM [TQP] Discuss with C/P about Water Treatment @MCWD [LDS] Discuss with C/P about Distribution and Leakage @MCWD [C]MCWD >> Hotel	
17	Oct.30 (Tue)	AM [C] Report to MCWD @MCWD [C] Hotel >> MCWD	Cebu
		PM [C] Discussion with MCWD @MCWD [C] MCWD >> Hotel	
18	Oct.31 (Wed)	AM Departure from Cebu [QL] PR434: CEB/0750 - NRT/1330(JPT) [TDP] PR848: CEB/1000 - MNL/1115 Hotel >> Airport	Manila
		PM [C] Report to JICA Philippine Office Airport >> JICA (14:00) >> Hotel	
19	Nov.1 (Thu)	Departure from Manila [C] PR432: MNL/1455 - NRT/2010(JPT) Hotel >> Airport	—

Mark [C] means the common activity, [T]: Team Leader, [P]: Water Treatment (Purification), [Q]: Water Quality Management, [L]: Leakage Prevention, [D]: Distribution System, [S]: Support Engineering Staff

Technical Assistance on Water Supply Operation and Management for Metropolitan Cebu Water District: The fourth field operation

Date: February 3 (Sun) - February 23 (Sat), 2013 21 days

Day	Date	Activities	Stay
1	Feb.3 (Sun)	[C] Transfer from Tokyo to Cebu (Without [M] / [M] joins from Feb.17.) PR433: NRT/1430(JPT) - CEB/1825 Airport (19:45) >> Hotel	Cebu
2	Feb.4 (Mon)	AM [C] Kick off meeting with MCWD (Explanation of 4th Field Operation) @MCWD Hotel >> MCWD	Cebu
		PM [C] Discuss about results of both assignments / Confirm schedule @MCWD MCWD >> Hotel	
3	Feb.5 (Tue)	AM [C] Field operation work about Water Treatment @MCWD / Tisa / Talamban JICA Philippines officer joins the tour of field operation from 9:00AM to 3:45(DL4:15)PM Hotel >> MCWD >> Tisa >> DMA16&17 >>	Cebu
		PM [C] Field operation work about Distribution and Leakage @Talamban > DMA25A JICA Philippines officer joins the tour of field operation from 9:00AM to 3:45(DL4:15)PM DMA25A >> W34 >> Talamban >> Hotel	
4	Feb.6 (Wed)	AM [TPQ] Experiment Baffling plates for sedimentation and Rehabilitation of sand filter @Tisa [LS] Arrangement about Leakage survey plan @MCWD [D] Hydraulic Calculation of DMA16/17/19&20 @MCWD >> Talamban Hotel >> MCWD / Tisa >> Talamban	Cebu
		PM [TPQ] Experiment Baffling plates for sedimentation and Rehabilitation of sand filter @Tisa [LS] Arrangement about Leakage survey plan @MCWD [D] Hydraulic Calculation of DMA16/17/19&20 @ Talamban >> MCWD Talamban >> MCWD / Tisa >> Hotel	
5	Feb.7 (Thu)	AM [TPQ] Experiment Baffling plates for sedimentation and Rehabilitation of sand filter @Tisa [LS] Arrangement about Pipe replacement plan @MCWD [D] Hydraulic Calculation of DMA16/17/19&20 @ Talamban >> MCWD Hotel >> MCWD / Tisa	Cebu
		PM [TPQ] Experiment Baffling plates for sedimentation and Rehabilitation of sand filter @Tisa [LS] Arrangement about Pipe replacement plan @MCWD [D] Hydraulic Calculation of DMA16/17/19&20 @ Talamban MCWD / Tisa >> Hotel	
6	Feb.8 (Fri)	AM [TPQ] Experiment Baffling plates for sedimentation and Rehabilitation of sand filter @Tisa [LDS] Discussion about Pipe replacement plan @MCWD Hotel >> MCWD / Tisa	Cebu
		PM [TPQ] Experiment Baffling plates for sedimentation and Rehabilitation of sand filter @Tisa [LDS] Discussion about Pipe replacement plan @MCWD MCWD / Tisa >> Hotel	
7	Feb.9 (Sat)	[C] Making report materials / Project Team Meeting	Cebu
8	Feb.10 (Sun)	[C] Making report materials / Project Team Meeting	Cebu
9	Feb.11 (Mon)	AM [TPQ] Experiment of Rehabilitation for sand filter @Tisa [LDS] Discussion about Leakage survey @MCWD / Talamban Hotel >> MCWD / Tisa / Talamban	Cebu
		PM [TPQ] Experiment of Rehabilitation for sand filter @Tisa [LDS] Discussion about Leakage survey @MCWD / Talamban MCWD / Tisa / Talamban >> Hotel	
10	Feb.12 (Tue)	AM [PQ] Experiment of Rehabilitation for sand filter @Tisa [LDS] Discussion about Leakage survey @ Talamban Hotel >> Tisa / Talamban	Cebu
		PM [PQ] Experiment of Rehabilitation for sand filter @Tisa [LDS] Leakage survey in night (from 10pm) @ in the city Tisa / In the city >> Hotel	

Day	Date	Activities	Stay
11	Feb.13 (Wed)	AM [TPQ] Experiment Baffling plates for sedimentation and Rehabilitation of sand filter @Tisa [LDS] Discussion about Pipe replacement plan @MCWD Hotel >> MCWD / Tisa	Cebu
		PM [TPQ] Experiment Baffling plates for sedimentation and Rehabilitation of sand filter @Tisa [LDS] Discussion about Pipe replacement plan @MCWD MCWD / Tisa >> Hotel	
12	Feb.14 (Thu)	AM [PQ] Discussion about Dilution of Nitrogen @MCWD [TLS] Discussion about Pipe replacement plan @MCWD [D] Discussion about Distribution Block (Less than 24 hours) @MCWD Hotel >> MCWD	Cebu
		PM [PQ] Discussion about Dilution of Nitrogen @MCWD [TLS] Discussion about Pipe replacement plan @MCWD [D] Discussion about Distribution Block (Less than 24 hours) @MCWD MCWD >> Hotel	
13	Feb.15 (Fri)	AM [PQ] Experiment of removal Iron/Manganese @W35 [TLS] Discussion about Pipe replacement plan @MCWD [D] Discussion about Distribution Block (Less than 24 hours) @Talamban Hotel >> MCWD / W35 / Talamban	Cebu
		PM [PQ] Experiment of removal Iron/Manganese @W35 [TLS] Discussion about Pipe replacement plan @MCWD [D] Discussion about Distribution Block (Less than 24 hours) @Talamban MCWD / W35 / Talamban >> Hotel	
14	Feb.16 (Sat)	[C] Making report materials / Project Team Meeting	Cebu
15	Feb.17 (Sun)	[C] Making report materials / Project Team Meeting [M] Transfer from Tokyo to Cebu PR433: NRT/1430(JPT) - CEB/1825	Cebu
16	Feb.18 (Mon)	AM [PQ] Discussion about Water Treatment @MCWD / Talamban [LS] Discussion about Leakage prevention @MCWD / Talamban [TMD] Discussion about Business management (MCWD2020Plan, PI) @MCWD Hotel >> MCWD / Talamban	Cebu
		PM [PQ] Discussion about Water Treatment @MCWD / Talamban [LS] Discussion about Leakage prevention @MCWD / Talamban [TMD] Discussion about Business management (MCWD2020Plan, PI) @MCWD MCWD / Talamban >> Hotel	
17	Feb.19 (Tue)	AM [PQ] Discussion about Water Treatment @MCWD / Talamban [LS] Discussion about Leakage prevention @MCWD / Talamban [TM] Discussion about Business management (CS/ES) @MCWD [D] Discussion about Mapping system @MCWD Hotel >> MCWD / Talamban	Cebu
		PM [PQ] Discussion about Water Treatment @MCWD / Talamban [LS] Discussion about Leakage prevention @MCWD / Talamban [TM] Discussion about Business management (PR) @MCWD [D] Discussion about Mapping system @MCWD MCWD / Talamban >> Hotel	
18	Feb.20 (Wed)	AM [C] Project Team Meeting / Making report materials @MCWD Hotel >> MCWD	Cebu
		PM [C] Project Team Meeting / Making report materials @MCWD MCWD >> Hotel	
19	Feb.21 (Thu)	AM [C] Report to MCWD @MCWD Hotel >> MCWD	Cebu
		PM [C] Final Discussion with MCWD @MCWD MCWD >> Hotel	

Day	Date	Activities	Stay	
20	Feb.22 (Fri)	AM	Departure from Cebu [C] PR848: CEB/1000 - MNL/1115	Manila
			Hotel >> Airport	
		PM	[C] Report to JICA Philippine Office	
			Airport >> JICA (14:00) >> Hotel	
21	Feb.23 (Sat)		Departure from Manila [C] PR432: MNL/1455 - NRT/2010(JPT)	—
			Hotel >> Airport	

Mark [C] means the common activity, [T]: Team Leader, [P]: Water Treatment (Purification) System, [Q]: Water Quality Management, [L]: Leakage Prevention, [D]: Distribution System, [M]: Business Management, [S]: Support Engineering Staff

7.3 MCWD への報告(第1次～第4次現地業務)

第1次現地業務 2012年 3月22日(木)

第2次現地業務 2012年 6月28日(木)

第3次現地業務 2012年10月30日(火)

第4次現地業務 2013年 2月21日(木)

Report to MCWD



March 22, 2012 @MCWD

7-52

1. Urgent issues of MCWD 2

1 24hours water supply system

Average of water supply hour is 22 hours, not 24 hours.
Some areas are only 7 hours.

2 Reduction of Leakage rate

Non-Revenue Water (NRW) rate is 28%.
Reducing this rate makes cover for non-plentiful water resource.

3 Expansion of Service rate

Water supply service rate: 55% for 1.9 million population.
Competing private companies supply water to customers of the hotel.

4 Others

Ground water quality improvement / O&M of WTP / Improvement of management structure / Pubric Relation / Customer Satisfaction / Money transferred from general account, and Subsidies / ...

2. Demonstration facility by oxidation for iron and manganese removal 3

- It was confirmed that the Iron and Manganese can be removed by the experiment.
- In "W34B" well, is under constructing a demonstration facility using a sand filtration device after the addition of chlorine dioxide.
- Result of the Iron and Manganese will be evaluated after construction finished.



3. Reduction of nitrate concentrations 4

- The dilution method is valid for nitrate reduction of groundwater in the MCWD.
- "G5B" well has been diluted with the purified water from Tisa and other groundwater.
- Purified water from Tisa is the most effective. Therefore, Tisa's outflow may be desirable to increase.



Proposal

5

- It is important that monitoring the nitrate of supply water to customer.
- Due to difficult of Nitrate removal, It is important to enhance by dilution effect.
- It is desired that carry out properly maintenance of surface water purification plant for keep maximum capacity.



3. Improvement of Tisa

6

1) Design map

At first, it is necessary to make sure design map.

Contents

- # The size of facilities
- # Pipe location map
- # Water flow chart
- MCWD is measuring them in Tisa

3. Improvement of Tisa

7

2) Test of increase flow rate

- Purpose
To make sure condition of water treatment when Tisa Filter Plant demonstrated maximum capacity(10,000m³/d)

- Condition of water treatment
Receiving Well



- Sedimentation basin



3. Improvement of Tisa

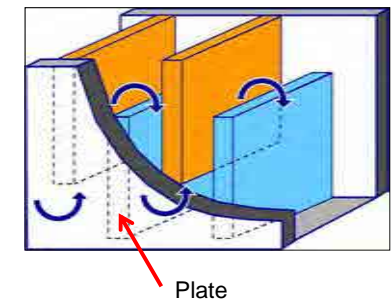
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3) Installation of vertical baffling type flocculation basin for good settling

- Installation Place
Integrated with sedimentation basin after the inlet from receiving well
- flow velocity
need 15 – 30cm/s, as standard
- structure
Bolted (easy to remove)

Until May

- Selection of plate Material
plastic or wood or others

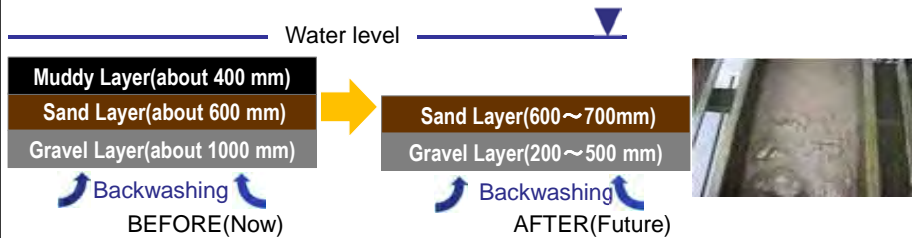


3. Improvement of Tisa

9

4) Improvement of rapid filtration basin

· Rehabilitation of rapid filtration basin



· Reconsideration of Back washing

Item	Now	Future
Water Volume	unknown	0.6~0.9 m ³ /min·m ²
Washing time	2~3 min	6 min

· Consideration of washing effluent pipe

7-54

3. Improvement of Tisa

10

5) Demonstration of Jar Test

Comparison of “Only Rapid mixing” and “Rapid mixing and Slow mixing”



→ “Rapid mixing and Slow mixing” is better for fine flocs
→ flocculation basin is important for good settled water

3. Improvement of Tisa

11

6) Dosage of PAC

Introduction of dosage control device

→ good effort

Optimum dosage of PAC

Dosage was 8 mg/L for measurement

For water quality, it is necessary to improve Tisa in terms of hard, and important optimum dosage of coagulant in terms of soft



Proposal

Water measuring equipment shall be provided to correctly measure the amount of raw water.

4. DMA model blocks

12

1) Improvement of less than 24hrs supply area

What is the course?

Pump capacity

Transmission pipe diameter

DMA area arrangement

Other

4. DMA model blocks

13

2) Introduction of Distribution Block System

Dilution of Tisa treated water and Wells
Compile DMAs between Tisa and G-3
Pipeline network analysis
Need more outlet volume from Tisa
Other

4. DMA model blocks

14

3) Decreasing of Leakage (NRW) rate

Leakage survey and Pipe replacement
Replacement old pipe to new: DMA25A
Leakage survey at Coastal road area
Compare leakage rate, before & after
Other

4. DMA model blocks

15

4) GIS and Mapping system

Best way of transfer from existing
Mapping and GIS data to New system
Mix some system of Mapping / GIS
Need Japan company's technology
Cooperation with Elec., Tele, Cable
Other

5. Business management

16

1) Customer Service / Satisfaction (CS)

Annual schedule of CS campaign
Bill collection system (Auto-Transfer)
Water condition announce to citizens
Citizen visitation to water facilities
Other

5. Business management

17

2) Evaluation of Business condition

Evaluation device / benchmarking
Review of Water Safety Plan (WSP)
SEAWUN Benchmarking program
Evaluation by improved Japanese PI
Annual Report & Mid-Long term plan

6. JICA PHL's Procurement

18

JICA will order some procurement

Water meter: DN150 x 2
Gate valve: DN150 x 4
Fire Hydrant: DN150 x 4
PEP: DN150 x 200m
Residual Chlorine meter
Water pump

JICA orders procurement to PH private company.
MCWD supports its specification preparation.

7. Construction

19

PT will order some construction

Pipe laying: DN150 x 200m
Hand hole: DN150 x 4
Flange arrangement: DN150 x 10
Surface washing pump setting &
electric construction: 1set

PT orders construction to PH private company.
MCWD supports its procedure and supervision.

8. MCWD Training

20

Training for MCWD in Japan

YWC&YWWB will hold 2 weeks training
Distribution course: 7-8 persons
Water Quality course: 2-3 persons
D: Block system, Leakage training yard, Mapping system, Pipe replacement plan, Leakage plan
Q: Physics & Chemistry, ICP-AES operation, Inspection of bacteria, Examination of biology
C: Backwashing, Flocculation, etc

9. Until Next Visitation

21

Assignment of PT and MCWD

PT: Study about less than 24hr area,
Hydraulic calculation, Baffling plates,
PI selection, GIS transfer

MCWD: Measurement of Nitrate, Design
of Baffling plates, Private water
supply vender's list, Proportion of
payment location



7-57

10. Next Visitation

22

PT will return on mid-May

What kind of job?

Study of improvement of receiving well,
Baffling equipment, Sand Filter Rehabilitation,
Progression of W-34B, Pilot DMAs, Preparation
of pilot DMAs construction, Improvement of
existing leakage survey plan, Field work of
leakage survey, Evaluation tools, Subsidies,
PR, Holding Seminar, etc



Report to MCWD



June 28, 2012 @MCWD

2nd Field Operation

3

2. Leakage Survey / Block Arrange

1. Demonstration of New Detecting Equipment
2. Finding Leak points and Planning of pipe replacement
3. Decision of construction pipeline location
4. Make the Countermeasure Plan of 24 hours water supply
5. Study of Backup system between DMAs

2nd Field Operation

2

1. O&M of WTP / Water Quality

1. Study of Flocculation (Baffling) Equipment
2. Study of Backwashing of Filtration
3. Study of Filtration Rehabilitation (Scrape Surface sand of Filtration)
4. Decision of PAC injection rate at Tisa WTP
5. Planning of Water Sampling
6. Removal of Fe/Mn and Dilution of Nitrate

2nd Field Operation

4

3. Business Management / Other

1. Study of Another Water Supply Competitor
2. Study of Customer's payment situation
3. Study of Water tariff and Subsidy
4. Study of Customer Service and PR
5. Study of Business & Performance Evaluation
6. Others

Others

5

1. One-Day Seminar on Jun.19 (5 titles)
2. Discussion about JICA Procurement
3. Discussion about Construction
4. Discussion about Training in Japan
5. Kick-off meeting & Reporting
6. Investigation & Survey ... Go Next

WTP O&M / Water Quality

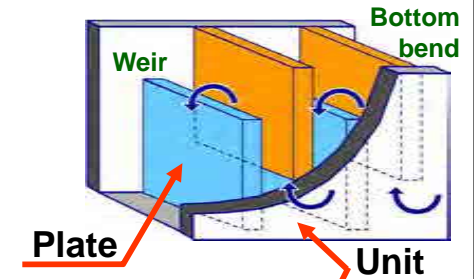
6

1. Study of Flocculation (Baffling) Equipment

With mixing slowly, make flocks sinkable.

Specifications

- 1) Bottom bend = 10
- 2) Weir = 11
- 3) Clearance = 0.2 & 0.5m
- 4) GT value = 8,700

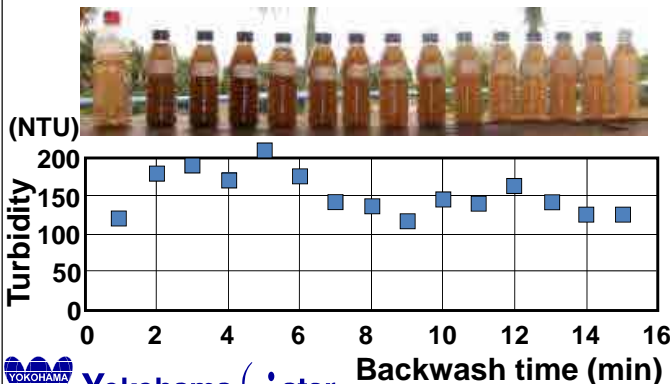


WTP O&M / Water Quality

7

2. Study of Filtration Backwashing

Back wash time of rapid filter is approximately 7 minutes now. It is expected to less cleaning because it does not become clean drainage after back wash. It considers more amount of water and water pressure will be needed.



WTP O&M / Water Quality

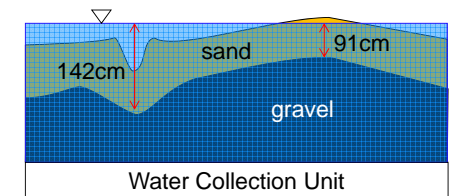
8

3. Study of Filtration Rehabilitation

Sand and gravel surface is undulating

Gravel level from water surface: 0.91 ~ 1.42m

Filtering & backwashing is done in-uniformly.



WTP O&M / Water Quality

9

4. Decision of PAC injection rate at Tisa WTP

Result of the calculation the approximate aluminum sulfate injection rate was 214mg/L.

Aluminum sulfate injection flow : 540mL/minutes

Specific gravity : 1.1

Raw water inflow : 4,000m³/day

$$540 \times 1.1 \times 60 \times 24 / 4,000 = 213.84\text{mg/L}$$

There is not so clear information that who and how to get this injection rate. Project Team would like to suggest to do the Jar-test for injection chart.



WTP O&M / Water Quality

10

5. Planning of Water Sampling

It is important to note that the accumulation and continuation of water quality monitoring at laboratory of MCWD.

Monitoring Item should not be so many, but important items should be selected you want.

In March session, Project Team asked to measure the "Nitrate" as new monitoring item of consumer's house.

Laboratory of MCWD has to act quickly and it was just started from this May. Project Team would like to continue to accumulate analysis.

Sample Date	Lab Code	Source	Description	Nitrate
TISA RES 05-09-2012	FX-011-12	Consumer	[1973]QUIBOY, GUMERSINDO	26.05 mg/L
TISA FILTERS 05-09-2012	FX-012-12	Consumer	[1603]MADERAZO, PEDRO	26.4 mg/L
05-09-2012	FX-014-12	Consumer	[58458]GUERRERO, WILHELM R.	18.87 mg/L
05-09-2012	FX-015-12	Consumer	[3364]YBANEZ, PASTOR	34.38 mg/L
05-09-2012	FX-016-12	Consumer	[48088]CABANES, ANTONIA	11.83 mg/L
05-09-2012	FX-017-12	Consumer	[49557]ENRILE, SOCORRO T.	20.6 mg/L



7-60

WTP O&M / Water Quality

11

6. Fe/Mn Removal & Nitrate Dilution

Experiment of oxidation of Fe/Mn is under continued at W34 well. PT has received a result the manganese concentration treated in W34. According to result, W34 manganese has not been removed because the reaction time of well water and sodium hypochlorite is short. And new sand is used in W34 that's why the new sand is not covered by manganese dioxide.

The new sand will be changed as manganese sand in continue this oxidation process, so continue this experiment.

Extending the reaction time might be difficult; PT would like to suggest that to continue this experiment without getting the results soon.



Leakage Survey

12

1. Demonstration of New Detecting Equipment

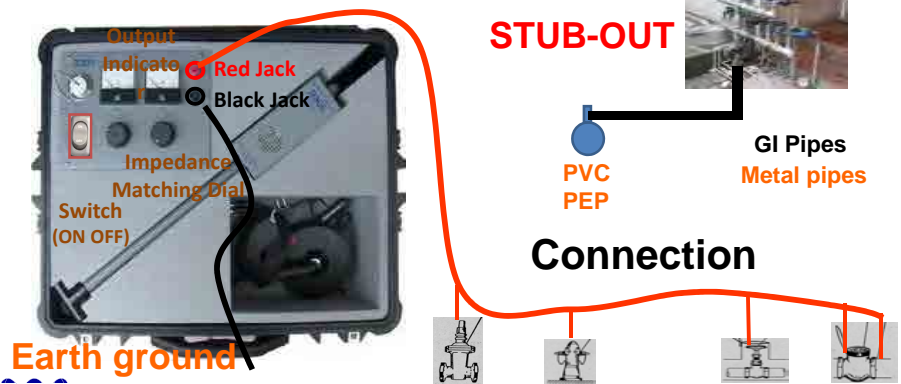
Valves, Hydrant, Water Meter, Ground cock

STUB-OUT



GI Pipes
Metal pipes

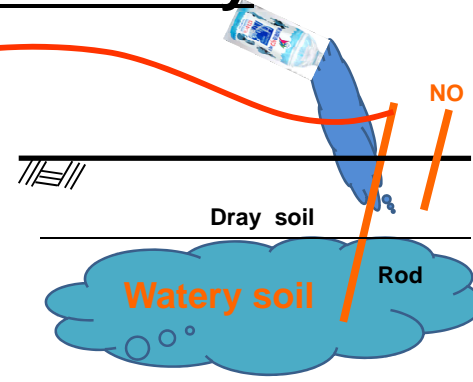
Connection



Leakage Survey

13

Transmitter



Black jack Connect Earth ground



- Effective use D305 Specialty
1. Leakage detection
 2. Pipe locator
 3. Pipe depth

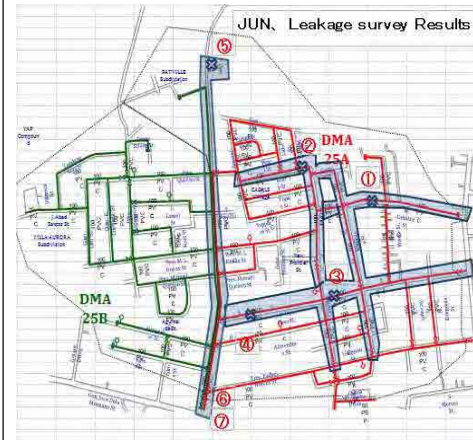


7-61

Leakage Survey

14

2. Finding Leak points & Planning of pipe Replacement



DMA 25A
1 - 7: Leakage point

- Other Area survey
- 1) DMA10C Area
 - 2) Lapu-lapu city
 - 3) Consolacion city
 - 4) Tisa WTP



Leakage Survey

15

3. Decision of construction pipeline



Leakage Point
Replacement line

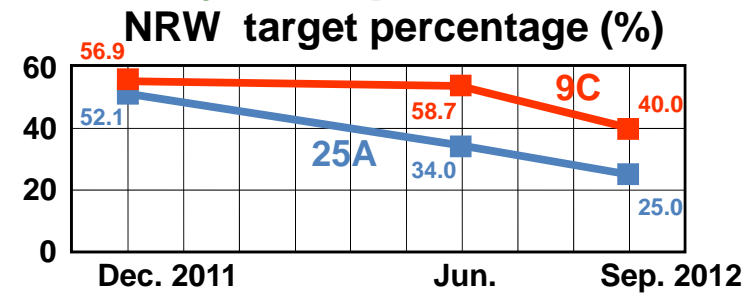
- 1) A lot of Leakage
- 2) Old Pipe
- 3) Pipeline Looping
- 4) Valves: 4
- 5) Hydrant: 3



Leakage Survey

16

4. Study of Leakage survey area on July to September



- 1) Effective utilization of D305
 - 2) Early found leakage point
 - 3) Quickly repair leakage point
 - 4) Leakage prevention work is endless
- } Reduce NRW



Leakage Survey

17

5. Conclusion

Good point

1) NRW profile data: Continue to

Recommendation

- 1) Operation & Maintenance of Valves box
- 2) Information sharing with Road Department
(Replacement of asphalt, cover valves box)
- 3) Water pressure measurement
- 4) Each DMA Division: 3 – 6 small area
- 5) Report (Leakage detection, Leakage point, Pipe repair)

Distribution Block Arrange

18

1. Study of DMA's Feature

Data collection of Land elevation / Number of connection and Water consumption from Node / Hourly Factor

2. Backup situation

Study of Location of valve and fire hydrant / Pipe looping / Elevation tank capacity

3. 24/7 and Gravity Frow, other

Study of Elevation tank setting location / Mixing tank for Nitrate Dilution

Business Management

19

1. Business Planning

Study of Business & Performance Evaluate / Subsidy / Water Supply Competitor

2. Customer Service

Study of Customer's payment situation / Procedure of new water supply applicants / Water meter reading situation / Commercial customer's opinions

3. Public Relations

Study of PR annual schedule / PR media

Assignment of MCWD (1)

20

1. Measurement of Nitrate sampling
2. Small change of W34 Plant
3. Manufacturing of Baffling plates unit
4. Experiment of Baffling plates unit
5. Study of sand filter rehabilitation
6. Experiment of Backwashing volume
7. Installation of Filtered water sampling

>>>

Assignment of MCWD (2)

21

8. OJT / usage of "D305"
9. Make a Leakage survey map of DMA
10. Maintenance of handhole of valve
11. Measurement of water pressure area
12. Hydraulic calculation of DMA:25A and High Nitrate area (G5B, G3, G4)
13. Study of PIs for MCWD renovation
14. Study of Bank Automatic Transfer
15. Study of Mascot of MCWD

Assignment of YWC&YWWB

22

0. Maintenance of USFM
1. Study about less than 24hrs area
2. Hydraulic calculation
3. PI selection
4. Study of Mapping renovation
5. Introduction of New GIS database
6. MCWD training in Japan

3rd Field Operation

23

Date: From September 26 (Draft)

Topics: Discussion about Assignment of MCWD&YWC, Construction in DMA25A, Study of Distribution Block Arrangement, Rehabilitation of Tisa WTP

Member: Without Management



Report to MCWD



October 30, 2012 @MCWD

Purposes of Dispatch

2

Distribution / Leakage

1. Discuss, review and revise the leakage detection/ survey plan → 80%
2. Discuss, review and revise the pipe replacement (rehabilitation) plan → 60%
3. Acquisition estimation from pipeline construction companies (excluding MCWD) → Completed
4. Discuss and create the countermeasure plan for 24 hours water supply → 60%
5. Study of Backup system between DMAs → 60%
6. Hearing of Mapping system → 80%
7. Design of the Pipeline Training Facility → 80%

Purposes of Dispatch

3

Water Treatment / Quality

1. Manufacturing of Baffling plates and Examination of their effects → 40%
2. Rehabilitation of Rapid sand filtration: Carrying sand out, Check basin wall and under collection → Completed
3. Study of Backwashing time after rehabilitation and setting of Baffling plates → Not yet
4. Distribution water sampling plan around high Nitrate Nitrogen area → 60%
5. Removal Fe/Mn filter plant → W35
6. Study of dilution Tisa series water and G3/G4/ G5B well water → 60%

Purposes of Dispatch

4

Business Management / Other

1. Study of Performance Indicators (PIs) of MCWD business evaluation → Completed
2. Creation and selection of some PIs to evaluate MCWD business → 60%
3. Study and hearing of Mapping system condition of another enterprise → Completed
4. Others

Hourly Factor

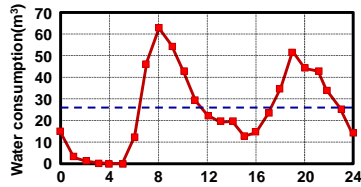
5

Hydraulic calculation must be calculated in unfavorable conditions.

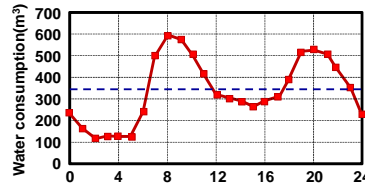
Bad conditions are in these situation.

- 1) Select one day of maximum daily supply
- 2) Calculate average and maximum water supply in this day

$$\text{Hourly factor} = \text{Max.}(m^3) / \text{Ave.}(m^3)$$



Resident area: HF=2.20



Commercial area: HF=1.58

Leak detection & survey plan

6

Documentation of MCWD leak survey
Leak survey History & Future Plan

1st leak detection plan (1995 to 2000)

1995: Organized 1 Leak Detection Team

2nd leak detection plan (2001 to 2009)

JICA recommendation plan (2010)

Leakage staff: 5 teams x 4 members x 1.5km

3rd leak detection plan (2010 to 2012)

Survey area: divide into 3 areas

Leakage staff: 3 teams x 6 members x 2.6km

4th leak detection plan (2013 to 2020)

See attached paper

4th Leak Detection Plan

7

Conditions in achieving the projected NRW rate by 2013 to 2020

1. Replacement of old to new pipes using DIPs (Ductile Iron pipes)
2. Additional of one team to present three teams
3. Implementation of Leakage Survey Plan using Mesh System approach in the GIS
4. Abandonment of unnecessary pipelines

4th Leak Detection Plan

8

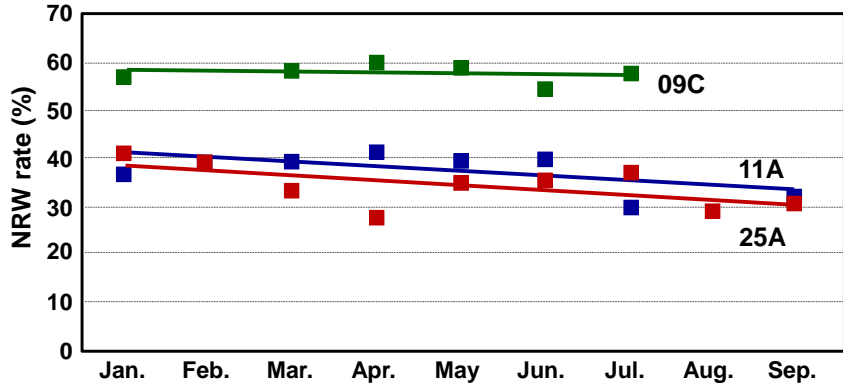
Conditions in achieving the projected NRW rate by 2013 to 2020

5. Monitoring of unbilled authorized water extraction from LGUs (Local Gov't. Units)
6. Installation of PRV's (Pressure Reducing Valves) Installation of Pressure Loggers
7. Installation of Leak Noise Loggers
8. Enhancement of leak detection personnel capability through training in the proposed leak detection yard facility

NRW in 3 Pilot Area

9

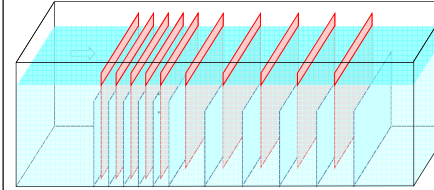
NRW(%)	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
DMA09C	56.9		58.1	60.1	58.7	54.5	57.5		
DMA11A	37.1	39.3	39.9	41.8	39.8	40.2	30.0		31.9
DMA25A	40.3	37.6	32.8	27.1	34.0	34.8	35.6	29.1	30.0



WTP O&M / Water Quality

10

Manufacturing of Flocculation (Baffling) Equipment



WTP O&M / Water Quality

11

Study of Filtration Rehabilitation

Existing component was confirmed.

New setting was discussed.

EXISTING COMPONENT NEW PLAN

PARTICLE SIZE	EFFECTIVE DIAMETER
0.3 ~ 2.0mm	0.6mm ± 0.1mm
2.0 ~ 4.0mm	
4.0 ~ 9.0mm	
9.0 ~ 30.0mm	

WTP O&M / Water Quality

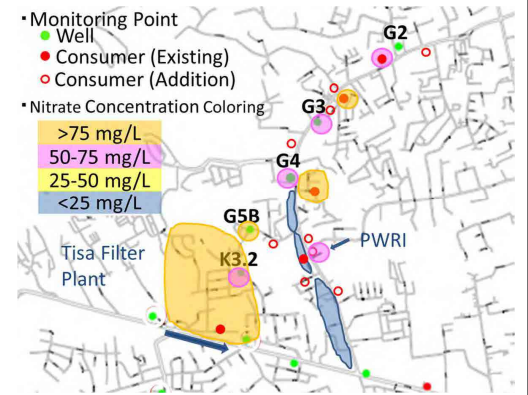
12

Dilution of high nitrate well (1)

This time, Project Team received the results of Nitrate monitoring from may until now. Based on it, We could confirm the condition of high nitrate, and reconfirm the necessity of dilution by Tisa treatment water.

In addition, to know the whole area, we have confirmed to increase number of monitoring point.

Currently, Laboratory of MCWD has measured concentration of nitrate.



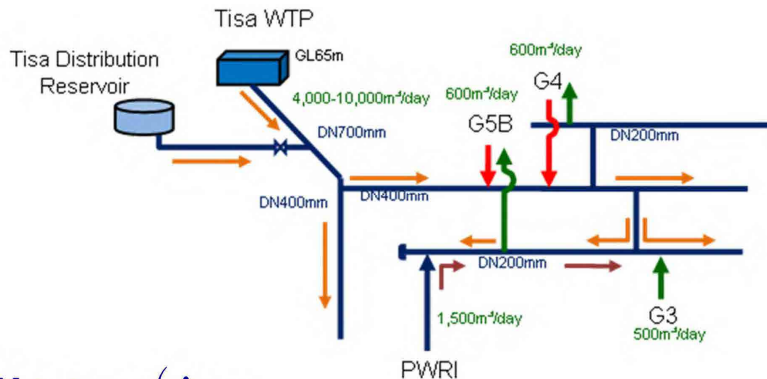
WTP O&M / Water Quality

13

Dilution of high nitrate well (2)

Next step, we will decide to a plan of dilution by the result of nitrate monitoring and pipe network.

This is one of the plan



WTP O&M / Water Quality

14

Fe/Mn Removal

Experiment of oxidation of Fe/Mn was finished at W34 well. According to W34 water quality measurement result, iron and manganese has been removed below target value.

We confirm the effect of this equipment, but this equipment was shuttered in August.

In place of W34, We confirm the experiment of “Birm” at W35. By the on-site experiment, iron removal effect is good.

In addition, MCWD is promoting the production of small remodeling W34 equipment for W35. In determining a plan, We discuss that “water quality” and “cost” is important.



W34



W35: Birm

Performance Indicators (PIs)

15

Evaluation of progression of 2020PLAN

To calculate PIs should be

- 1) easy data collection and calculation (equation)
- 2) able to explain easily
- 3) announced their results to customers
- 4) reviewed their results at the end of every cycle
- 5) able to evaluate long years and set benchmarking value

Performance Indicators (PIs)

16

Evaluation of progression of 2020PLAN

Revise selected PIs of 2020PLAN

- 1) Numbering to all PIs
- 2) Show changing chart and table
- 3) Trace PI data
- 4) Why high, low? Need this value?
- 5) Analyzing what part is wrong
- 6) Refer to next replacement, rehabilitation
- 7) Announce to other WD and the world

Documentation

17

Additional PI: Documentation rate

One planning consists some text documents.

- 1) Back ground and its History
- 2) Purpose and Target
- 3) Contents with Chart and Table
- 4) Appendix
- 5) Revision record (version)

Documentation rate (%) = Number of Completed Document / Total Plan x 100

Assignment

18

Administration

Study of PIs for MCWD renovation
Study of Mascot of MCWD

Water Quality

Sampling of high Nitrate area
Construction and Test of W35

Water Treatment

Manufacturing and Experiment of Baffling plates unit
Study of sand filter rehabilitation (Gravel selection, Refill sand after washing and screening, Setting of Partition Net)
Experiment of Backwashing volume
Installation of Filtered water sampling device (Faucet)

Distribution System / Leakage Management

Make Leakage survey map by new survey mesh setting in [A] area
Study of backup between DMAs and hydraulic calculation of less than 24 hours water supply area
Hydraulic calculation of DMA25A and High Nitrate area
Construction of pipeline in DMA25A (Contract, Supervising, Reporting)

4th Field Operation

19

Date: From later part of January, 2013

Topics: Discussion about Assignment of MCWD&YWC, Construction in DMA25A, Study of Distribution block Backup, Rehabilitation of Tisa WTP, Administration & PIs

Member: All member (7 persons)

Report: Make a Final Report (Draft)



Report to MCWD



Project Scheme

1) Technical Support Project for MCWD
 From March 2012 to March 2013 by YWC & YWWB, 4 times Dispatch and Training in Japan

- Mar. 2012: The 1st Field Operation
- Jun. 2012: The 2nd Field Operation
- Jul. 2012: Training in Yokohama
- Oct. 2012: The 3rd Field Operation
- Feb. 2013: The 4th Field Operation

2) Targets of this Project

Study of solution: Improvement of Water quality and treatment, Decreasing of NRW rate, Solve water supply area of less than 24 hours, Improvement of Service rate, PR & CS, Etc.

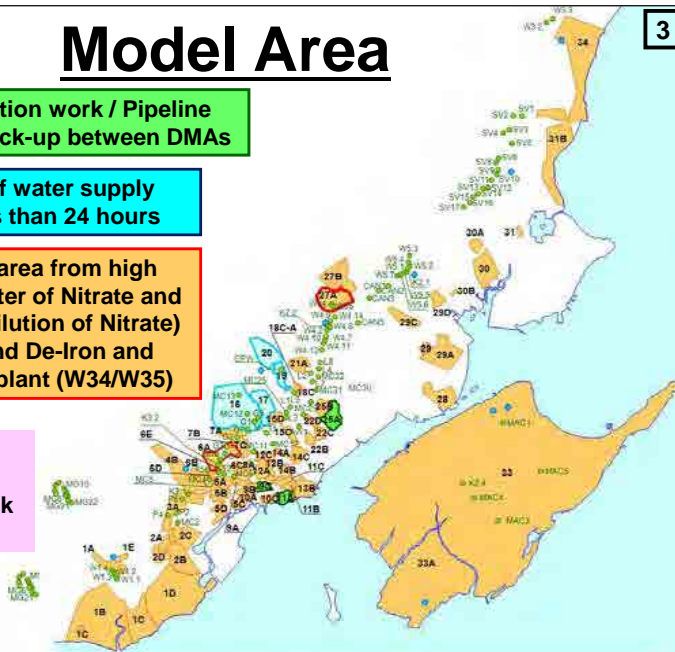
Model Area

Leakage prevention work / Pipeline rehabilitation / Back-up between DMAs

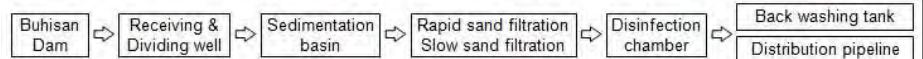
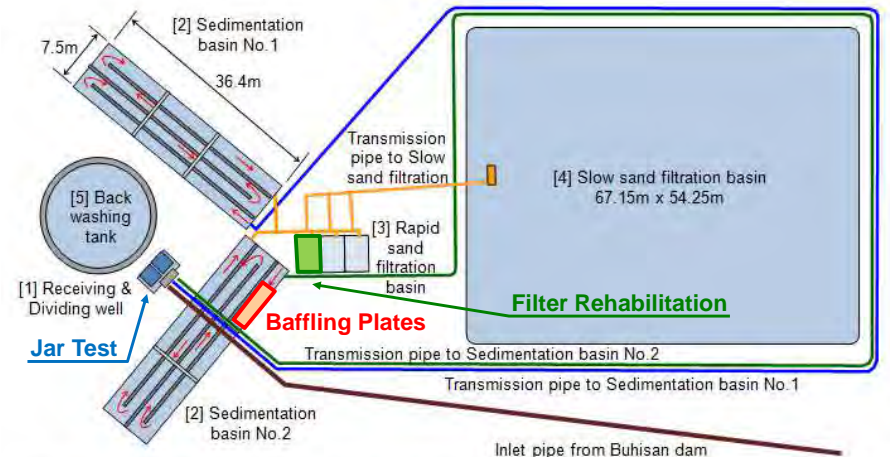
Improvement of water supply district has less than 24 hours

Blocking large area from high concentration water of Nitrate and Tisa WTP area (Dilution of Nitrate) (G3/G4/G5B) and De-Iron and Manganese test plant (W34/W35)

- Coastline
- DMA
- Distribution Tank
- Deep well



Tisa Filtration Plant



Project Study & Activity

5

1. O&M of WTP / Water Quality

1. Flocculation (Baffling) Equipment
2. Rapid Sand Filtration Rehabilitation
3. Backwashing of Filtration
4. Decision of PAC injection rate
5. Water Sampling Plan
6. Removal of Fe/Mn
7. Dilution of Nitrate

Project Study & Activity

6

2. Leakage Survey / Distribution

1. Finding Leak points and Planning of pipe replacement
2. Demonstration of Detecting Equipment
3. Pipe Rehabilitation Project in DMA25A
4. Evaluation of NRW rate in Model DMA
5. Continue 24 hours water supply
6. Backup System between DMAs
7. Mapping System Improvement
8. Pipeline Training Yard

Project Study & Activity

7

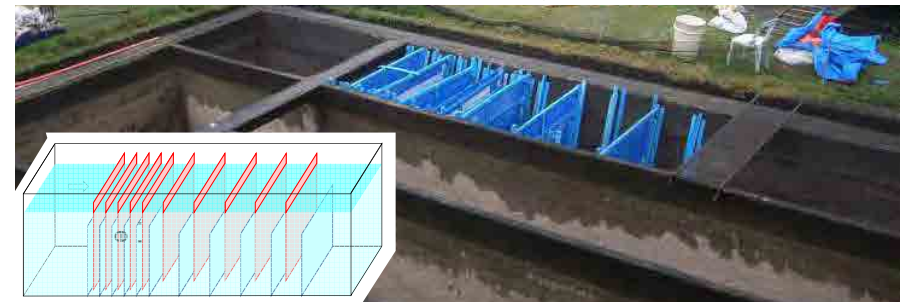
3. Business Management / Other

1. Evaluation by Performance Indicator (PI)
2. Water Supply Competitor
3. MCWD Subsidy / Government Subsidy
4. Customer Service
5. Employee's Satisfaction
6. Effective Public Relation

Water Treatment System

8

1. Flocculation (Baffling) Equipment



Installed plates are 15, now. Total will be 21 plates. Monitor of turbidity started from November, 2012. November, 2012 only 6plates, Turbidity of settled water was changed from 7.6FTU to 6.7FTU (-12%).

Water Treatment System

9

2. Rapid Sand Filtration Rehabilitation



Rapid sand filter maintenance is for the first time after construction (1985). All filter sand & gravel brought out. After that gravels are sieved by particle size (L). Gravels are being washed (C). Under drain system and wall are repaired (R). Now, large gravels have already been refilled.



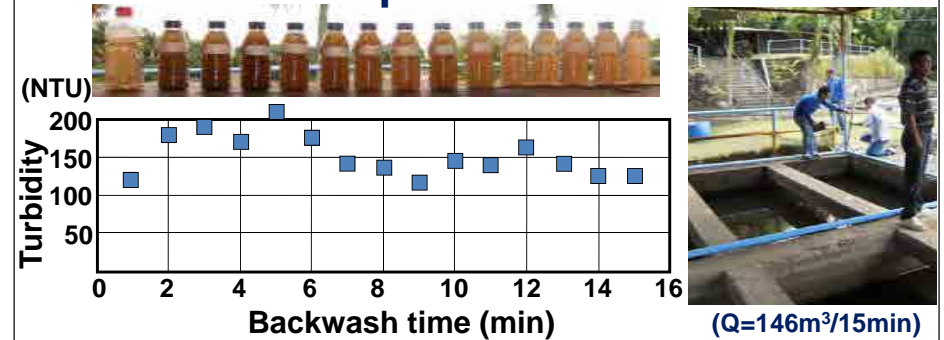
7-71

Water Treatment / Quality

10

3. Backwashing of Filtration

Backwash experiment in June 2012



After sand filter rehabilitation, backwash time and frequency are scheduled to be reviewed.

→ How (big) change!!!



Water Quality Management

11

4. Decision of PAC injection rate



With the improvement of Tisa, it is important to determine the rate of PAC injection by Jar-test.

- a. Jar-test condition change
Rapid mixing only → Rapid and Slow mixing
- b. Jar-test in Tisa Filter Plant
MCWD needs to carry out Jar-test at an appropriate frequency.



Water Quality Management

12

5. Water Sampling Plan

Item	Before project	After project
Nitrate	No sampling and testing for consumers	Sampling and testing for consumers
Residual Chlorine	25 sampling points testing for direct supply well (daily)	50 sampling points testing for direct supply well (daily)

→ The improvement of water quality management for safety water supply



Water Quality Management

13

6. Removal of Fe/Mn

High Fe / Mn well: W34B and W35



→The water quality of these wells area has improved by PWRI water. In the future, for expanding the new water supply area, We expect to establish the removal of Fe/Mn equipment.

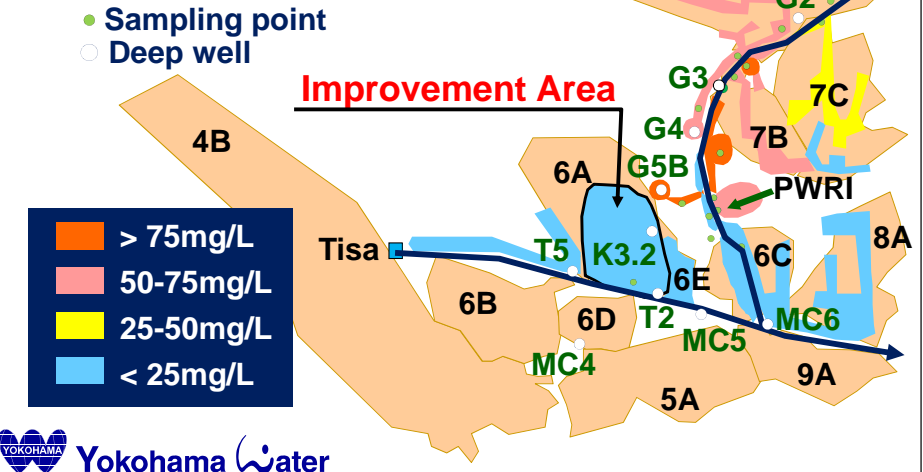


Water Quality Management

14

7. Dilution of Nitrate

Nitrate Concentration map

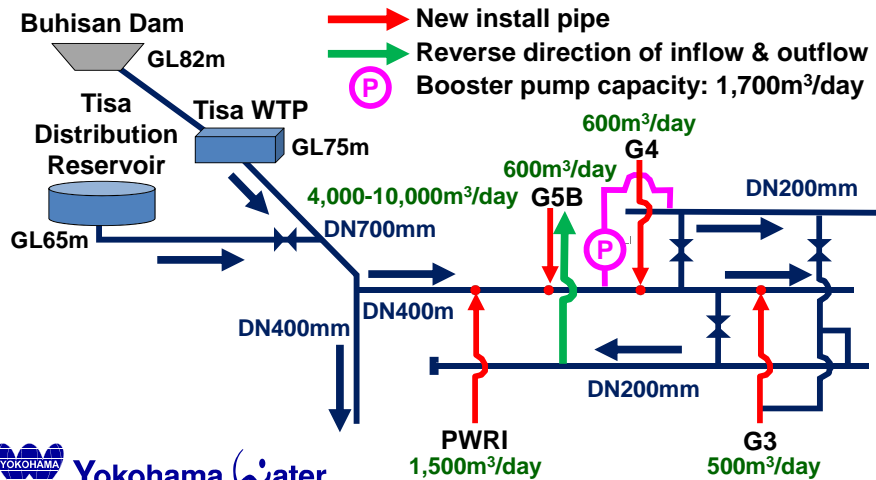


Water Quality Management

15

7. Dilution of Nitrate

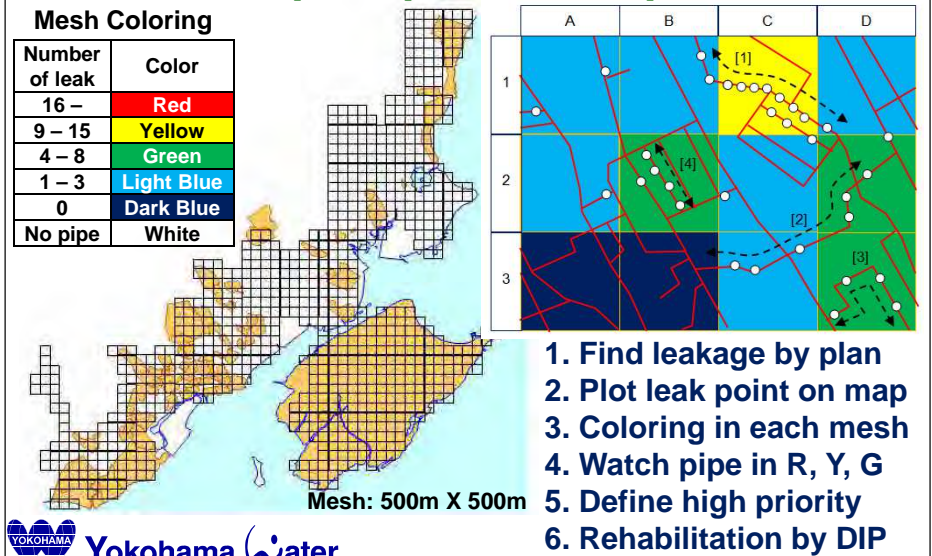
Dilution plan



Distribution System

16

1. Pipe replacement plan



Distribution System

17

2. Detecting Equipment Demonstration



Demonstration how to use leak detector "D305"

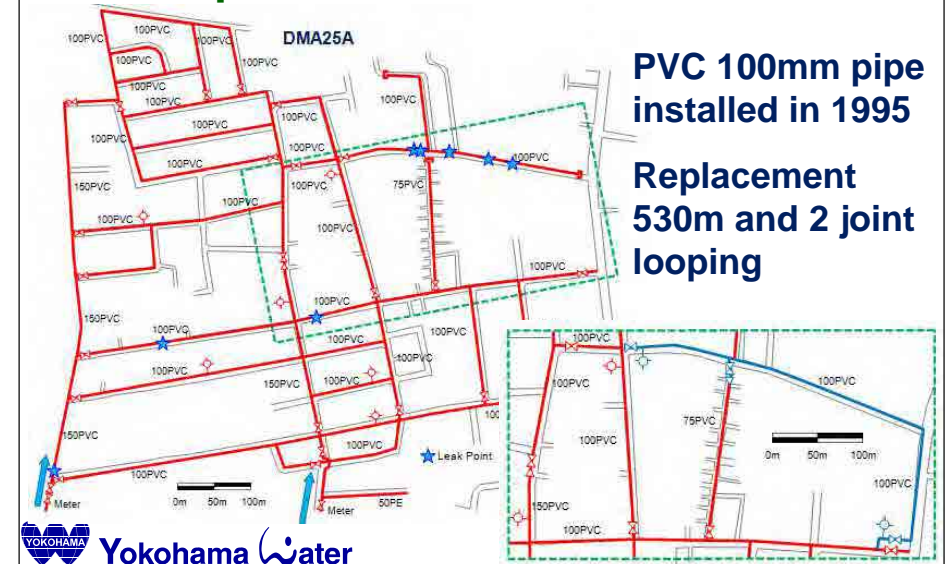


JOT how to use leak detector "D305"

Distribution System

18

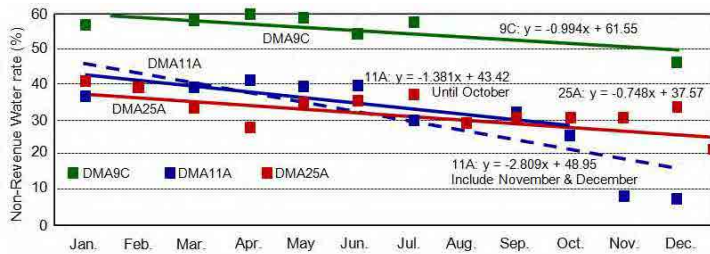
3. Pipe Rehabilitation in DMA25A



Distribution System

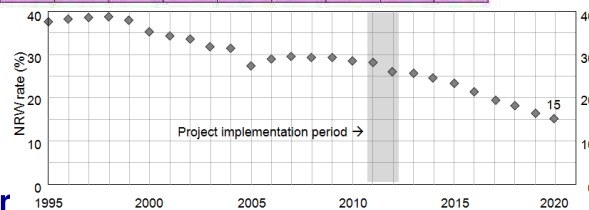
19

4. Evaluation of NRW rate in Model DMA



9C	56.9	ND	58.1	60.1	58.8	54.5	57.5	Inflow Meter Maintenance	47.1			
11A	37.1	39.3	39.9	41.8	39.8	40.2	30.0	ND	31.9	25.7	(8.1)	(7.8)
25A	40.3	37.6	32.8	27.1	34.0	34.8	35.6	29.1	30.0	31.4	31.6	34.5

DMA11A, 25A are decreasing NRW rate.



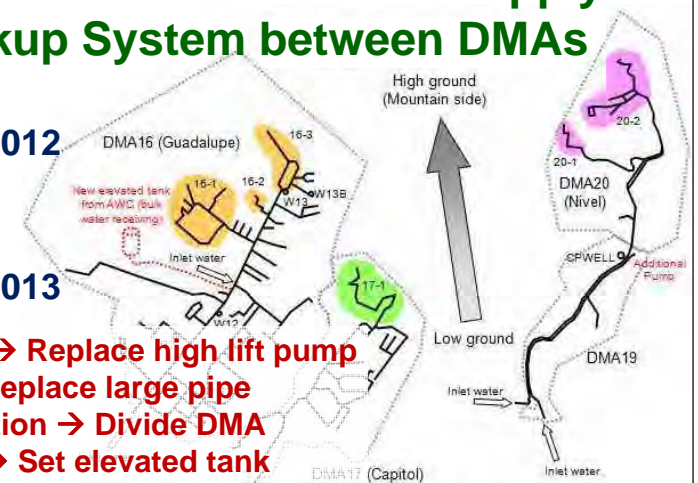
Distribution System

20

5. Continue 24 hours water supply 6. Backup System between DMAs

22.50 hours
March, 2012

23.15 hours
March, 2013



- Low Pressure → Replace high lift pump
- Small pipe → Replace large pipe
- High consumption → Divide DMA
- Power failure → Set elevated tank
- Water suspension → Backup / Looping

Distribution System

21

7. Mapping System Improvement

Item	Contents
(1) Detail Study/Research	KKC staffs research and study.
(2) Creation Digital Road Map	Aerial Photograph (Scale:1/1000)→ Creation Road Map (6 months – 1 year)
(3) Introduction of PC & input device	Server PC: 1, Client PC: 20 Scanner: 2 / Digitizer: 2
(4) Input Pipes & Facilities	Pipeline 800km, others
(5) Software installing	1 Server and 20 Clients
Total Amount	62,000,000 PHP

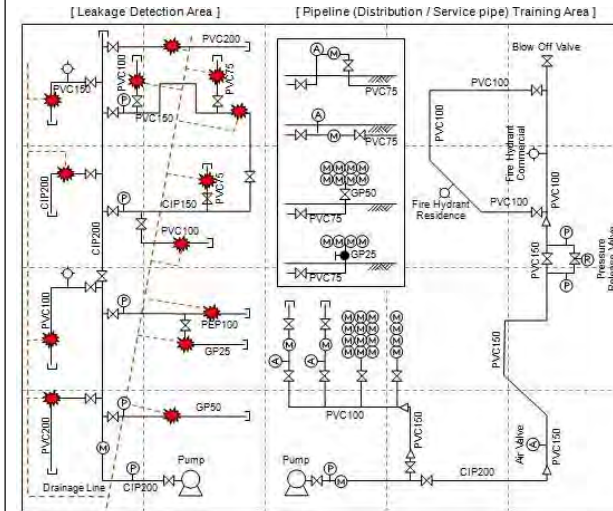
Item	Contents
(2) Creation Digital Road Map	Aerial Photograph (Scale:1/500)→ Creation Road Map(1 year – 2 years)
(3) Introduction of PC & input device	Server PC: 1, Client PC: 20 Scanner: 2 / Digitizer: 2
Total Amount	7,800,000 PHP



Distribution System

22

8. Pipeline Training Yard Design



Pipeline Training Yard at Talamban

Based on YWWB Pipeline Training Yard

1. Leak Survey
2. Distribution pipe setting
3. Service pipe setting

Not only MCWD But also other WD



7-74

Business Management

23

1. Evaluation by Performance Indicator

Project team held 1-day seminar and Yokohama training. After that MCWD has ...

PI selection of each department and creating KPI Manual.

Study aimed at introducing new Pis.

- Documentation preparation rate
- Procedure manual preparation rate
- Personnel transfers rate
- Personnel transfers times
- Staff suggestion rate



Business Management

24

1. Evaluation by Performance Indicator

To evaluate an organization is that how many good staff is in WD, and how WD operates in daily work. It is so important that every staff understands WD's plan and O&M, also, organization's activation, and staff knowledge improvement. These5 PIs are useful to evaluate organizing ability of WD.

(1-1) Documentation preparation rate [%]

$$= \frac{\text{Number of plan and project that completed document [number]}}{\text{Total number of plan and project [number]}} \times 100$$

(1-2) Procedure manual preparation rate [%]

$$= \frac{\text{Number of O&M procedure that completed manual [number]}}{\text{Total number of O&M procedure [number]}} \times 100$$



Business Management

25

1. Evaluation by Performance Indicator

(2-1) Personnel transfer rate [%]

$$= \frac{\text{Number of people who have transferred to other departments in the Personnel Transfer [person]}}{\text{Total number of staff [person]}} \times 100$$

(2-2) Personnel transfer times [times/person]

$$= \frac{\text{Number of times one staff has been personnel transfer until now [times]}}{\text{Total number of staff [person]}}$$

(3) Staff suggestion rate [number/person]

$$= \frac{\text{Total number of suggestions from staff (including papers, monographs) about improvement of their service [number]}}{\text{Total number of staff [person]}}$$



7-75

Business Management

26

2. Water Supply Competitor

3. MCWD Subsidy / Government Subsidy

MCWD has ...

the plan of survey to customers for business.

continuation research of competitors situation.

the plan of establishment of marketing & sales organization.

approach to the study of the state government towards the construction of a dam.



Business Management

27

4. Customer Service

MCWD has ...

the plan of scientific survey to customers (for the nonsupply area).

efforts towards the implementation of convenient payment.

Price check on a web page (since 2012)

Print out water bill from a web page (since 2012)



Business Management

28

5. Employee's Satisfaction

MCWD has ...

the plan of KAIZEN competition at anniversary celebration (February).

the plan of scientific survey on Employee's Satisfaction.

For New Human Resource Strategy



Business Management

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6. Effective Public Relation

MCWD has ...

"Agressive Promotions" in corporate plan 2013.

the plan of water education for school children and MCWD Mascot contest.

For New Corporate Image



NEXT STEP

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1. Declaration of the water safety district

- (1) Early achievement of 24 hours water supply in MCWD all supply area
→ Introduction of SCADA and distribution water pressure map
- (2) Safety improvement of Water quality
→ De-Iron/Manganese, Decreasing Nitrate
→ Introduction of SCADA and distributed Residual Chlorine map



NEXT STEP

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2. NRW Reduction, year by year

- (1) Effective leakage survey using Mesh
→ Linkage with Mapping system and effective pipe replacement
- (2) Early leak find and early point repair
- (3) SCADA management of water flow volume, water pressure and Residual Chlorine in distribution pipeline
- (4) Establishment of leak point report system



NEXT STEP

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3. Enrichment of training facility

- (1) Introduction of DIP, HDPE and repair of existing PVC pipe
- (2) Know-how of Leak detection
- (3) Water quality inspection
- (4) Know-how of water treatment system
- (5) Repair / maintenance of water meter
- (6) Customer Services (CS)
- (7) Commercialization of training business for another WD



NEXT STEP

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4. Others

- (1) Make full use of Mapping system
→ Optimal distribution pipe management / Link of leakage management / Asset management
- (2) Expansion of water supply cover rate
→ Development of surface water resource
- (3) Improvement of Customer Satisfaction / Reinforcement of Organization
- (4) Commercialization
→ Training / Water meter repair / Cover rate



GO NEXT

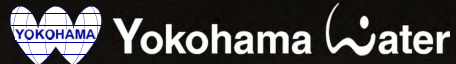
34

This JICA project of MCWD and YWC(JICA) will finish by the end of March, 2013.
However, our relation continues in the future.

See you soon.



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8. 参考資料

8.1 MCWD 2020 PLAN と Corporate Plan 2013

MCWDは中・長期目標である「MCWD 2020 PLAN」を達成するための単年度の事業計画として、「Corporate Plan 2013」を発表している。この他、実施報告として「Annual Report」も発表している。

本計画は2012年前期(6月まで)分の計画値により算定されており、2012年度は本プロジェクトの効果により、様々な数値が改善されているため、本報告書の内容との間で多少の数値の違いが発生していることから、実値は2012年欄に括弧書きで表している。

	2012	2013	2020
Cover rate (%)	39	43	66
Water sales (m ³ /d)	138,700	153,900	263,000
NRW rate (%)	27.5 (25.2)	26.1	15
Service connection (number)	146,325	157,700	
Revenue (Billion PHP)	1.225	1.385	
Subsidy to customer (%)	5	5	Small: 2 Commercial: 25

