Crisis management of Waterworks Emergency Service Unit

~Quick Response and Prompt Securement of Water Supply in the Event of Disaster~

Wataru Kiga：
The Director at Liaison and Coordination of Water Distribution Facilities, Construction, Water Supply Division, Bureau of Waterworks Tokyo Metropolitan Government.

【Today's Agenda】

1. Task of Waterworks Emergency Service Unit
2. Securing water supply routes
3. Summary

1．Task of Waterworks Emergency Service Unit

㊀Response at the time of an earthquake disaster

Various types of training

Technical support to each department

management department

②Response at the time of an unexpected accident

Training at normal times

1． Task of Waterworks Emergency Service Unit

㊀Response at the time of an unexpected accident

Emergency water supply
Initial PR activity
Information communication support

Water Truck
(2t)

Loud Speaker
Vehicles

Special Emergency
Vehicle

1. Task of Waterworks Emergency Service Unit

Training at normal times

Participate in disaster prevention drills

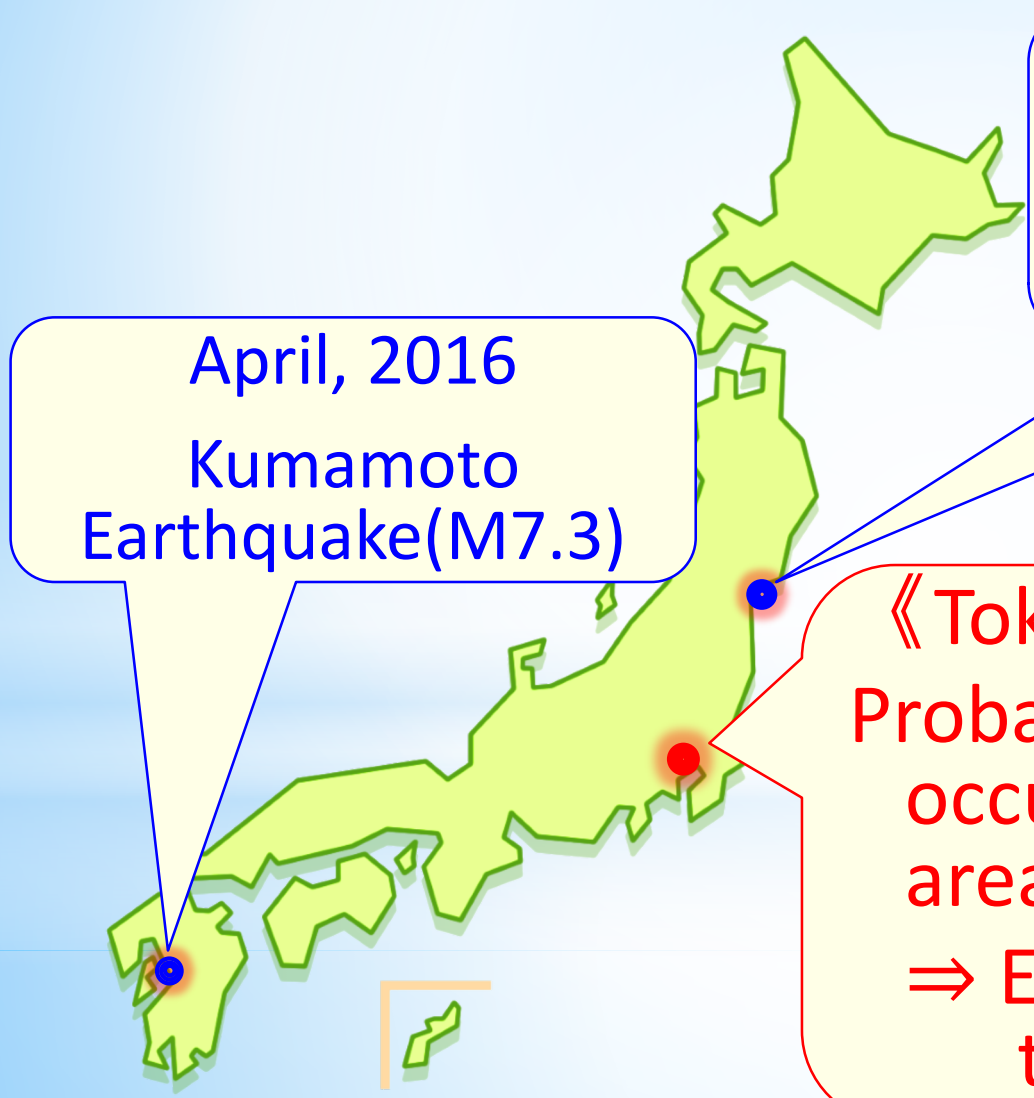
Tokyo Metropolitan Gov. disaster prevention drill

Islands disaster prevention drill

Disaster prevention event

2. Securing the water supply route

2.1 Background/ Objective



March, 2011

Earthquake off the Pacific Coast of Tohoku (M9.0)

April, 2016

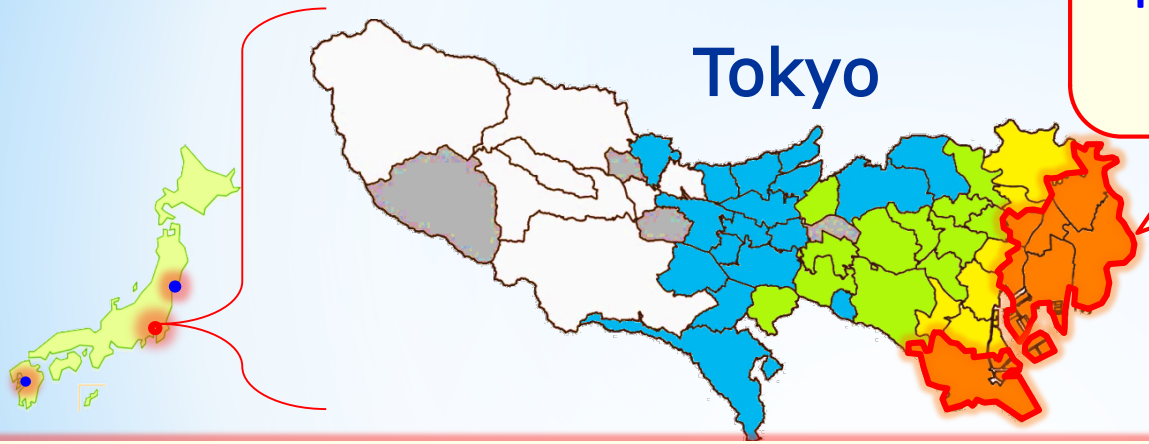
Kumamoto Earthquake(M7.3)

《Tokyo》

Probability of an earthquake occurrence in metropolitan area (M7 level)

⇒ Estimated at 70% over the next 30 years.

Assuming that an earthquake occurred in the metropolitan area,



Water suspension ratio is estimated to exceed 60%.

《Tokyo Metropolitan Waterworks Bureau(TMWB)》

Support lives of approx. 13 million residents in Tokyo and the capital's central agencies by securing water supply services

⇒ **At the time of an earthquake disaster: Securing water supply is significantly important.**

【Role of TMWB】

In order to maintain functions of Tokyo

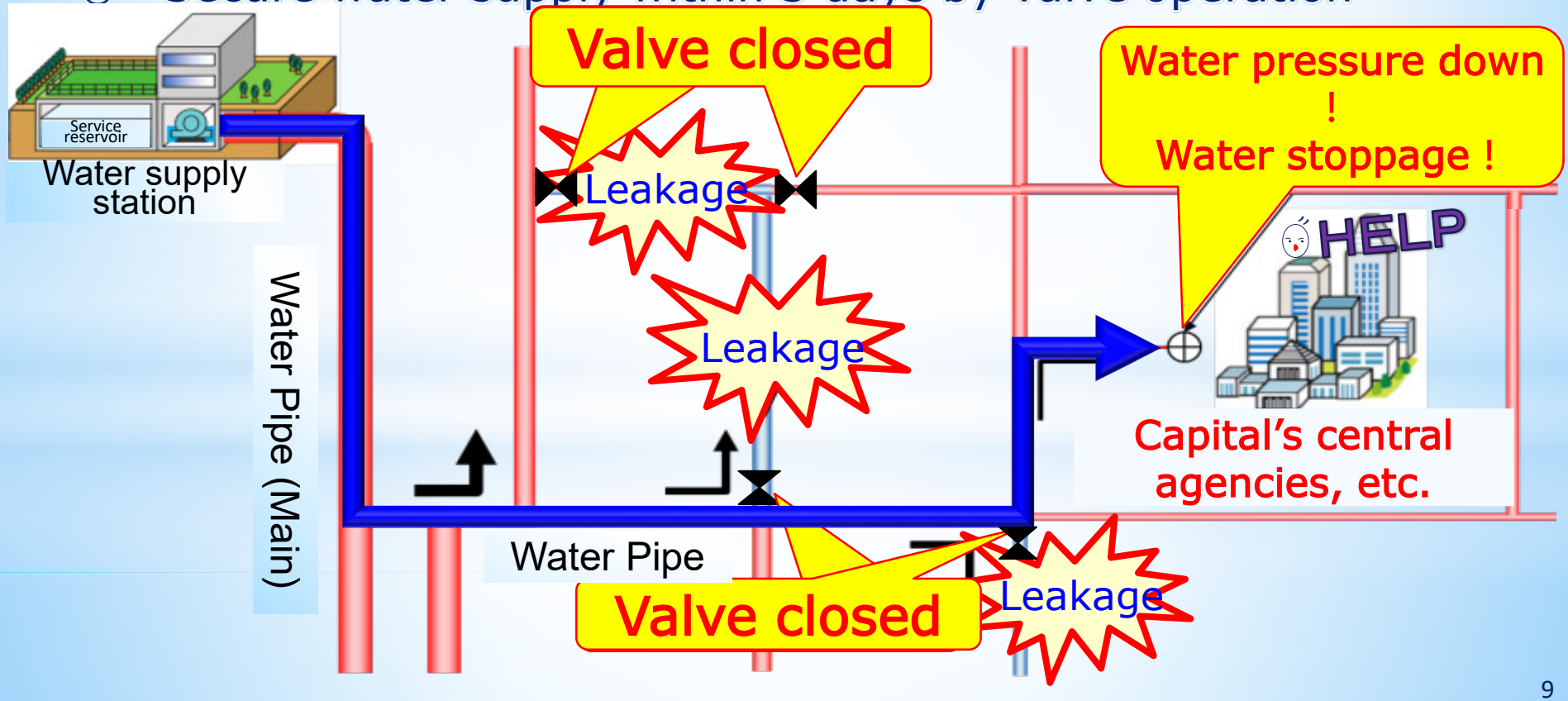
⇒ Quickly restore water supply to capital's central agencies.

《What are capital's central agencies?》

- Central institutions of the government with the administrative and economic sectors.
- Medical institutions and hospitals
- 140 facilities

《Securing water supply to the capital's central agencies》 (Dispatch to the site)

- Check the water pressure
- Investigate leakage on the supply route
- Secure water supply within 3 days by valve operation



【Great East Japan Earthquake : Unexpected situation】

- Tried to confirm the water pressure of the central agencies of the capital ⇒ Dispatched form the office

Heavy traffic congestion
《Unexpected situation》

↓ Result…

- More time than expected

(Initial assumption of 15 hours → Took 22 hours)

【First attempt as a water supplier in Japan】

《Unexpected situation = Proved fact》

- Even in case of unexpected situation

  → **Important to make it possible to quickly check water pressure**

- Narrow down target facilities for staff to be dispatched

  → **Important to achieve quick recovery activities**

【First attempt as a water supplier in Japan】

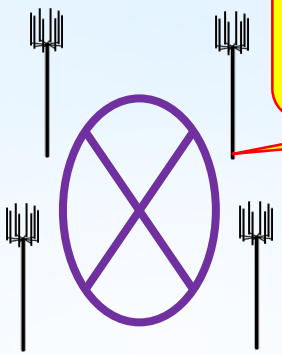
《Measures》

- **Formulated a water pressure monitoring system for target facilities**

- **Introduced for the first time as a water supplier in Japan**

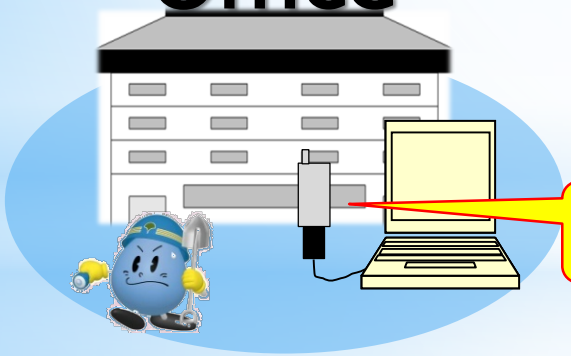
2 . System Configuration

⊖Via communication lines



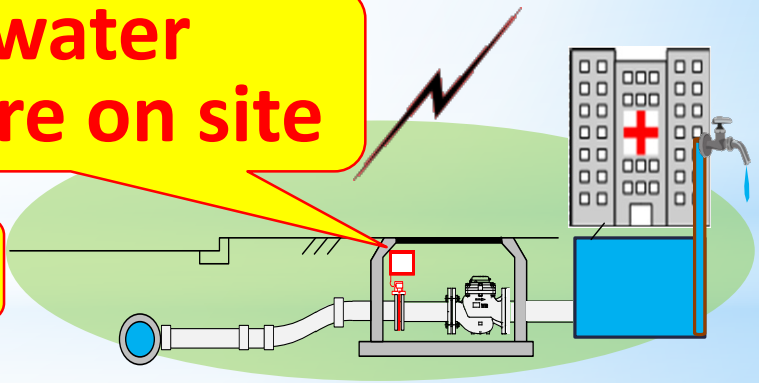
Communication lines

Office



⊛Check water pressure on site

⊖Transmit



Data collection system

Install terminal units at capital's central agencies

【⊖ Utilization of PHS Communication Lines】

- Communication line ⇒ Use PHS

  PHS : Wireless communication line with a frequency of 1.9 GHz band

《Reason for selecting PHS communication line》

・ Easier to secure lines (Urban area)

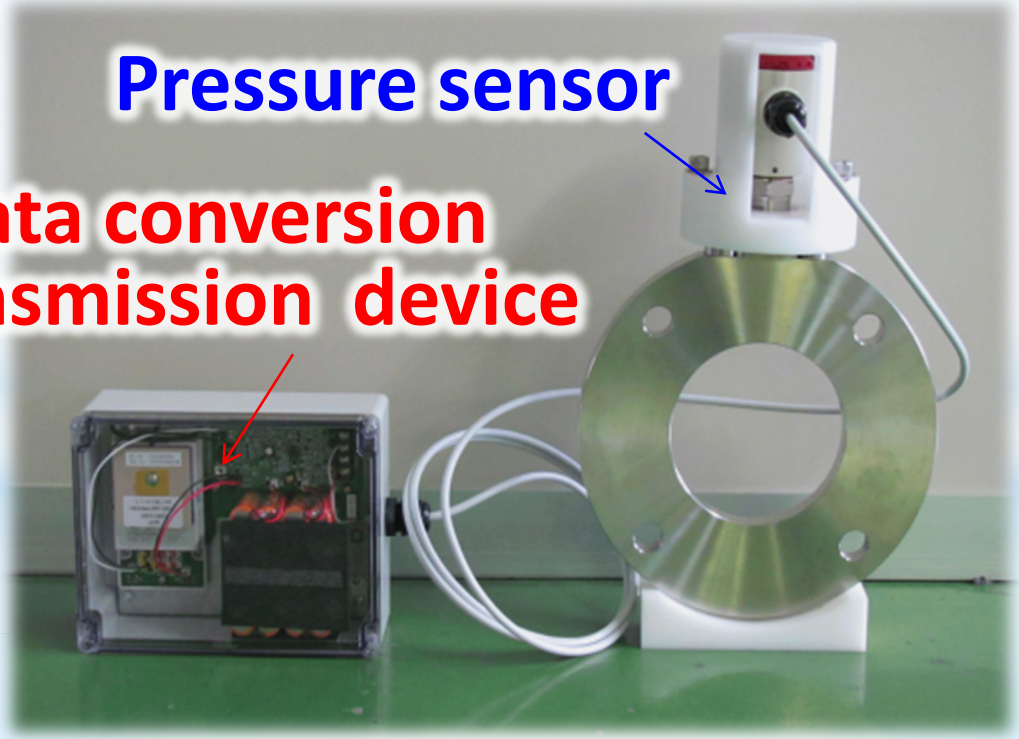
⇒At the time of past disasters :
No restriction was imposed for communication

・ Electric power saving, cheaper cost, low electromagnetic wave (Less impacts on medical instruments), etc.

【㊀ Development of a terminal unit for checking pressure】

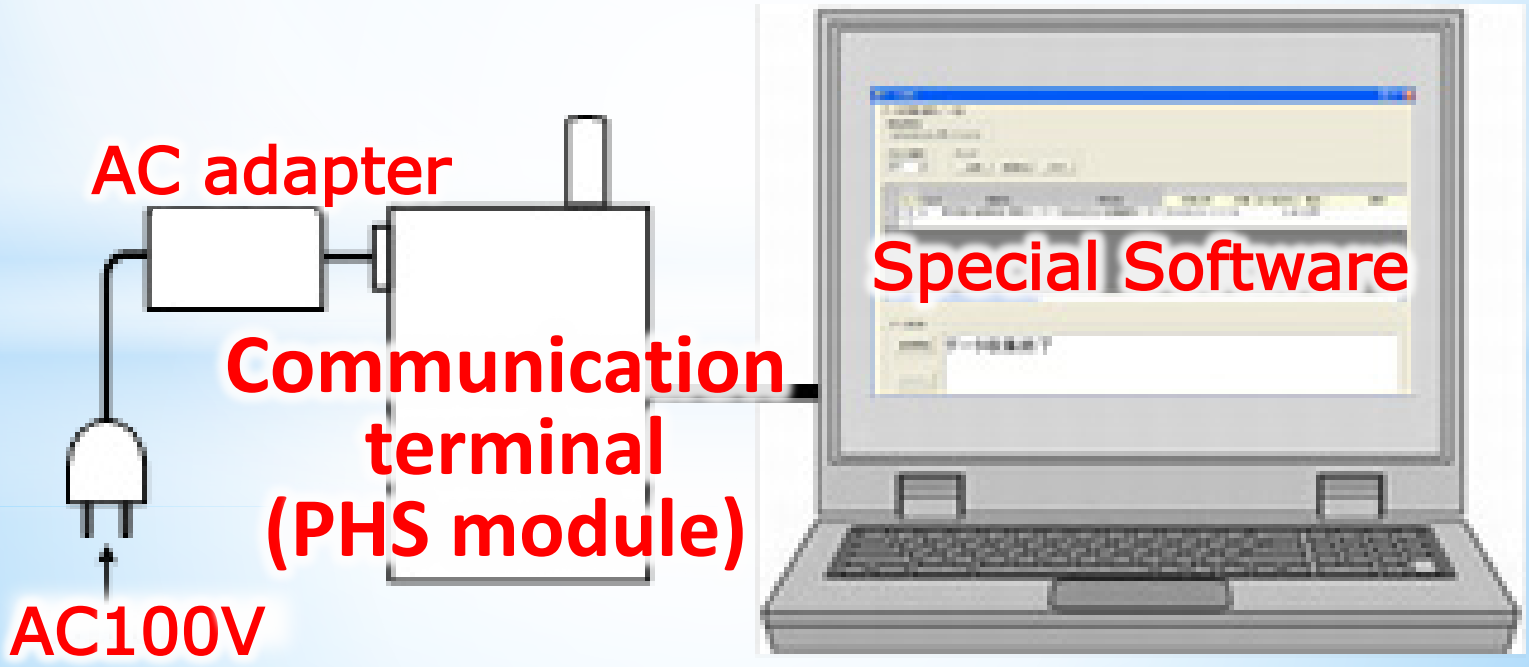
Configuration of terminal unit devices :

"Pressure sensor," "Data conversion/ transmission apparatus"



【⊛ Data Collection System 】

- Collective check at office: system to collect data
- System configuration: personal computer/ communication terminal

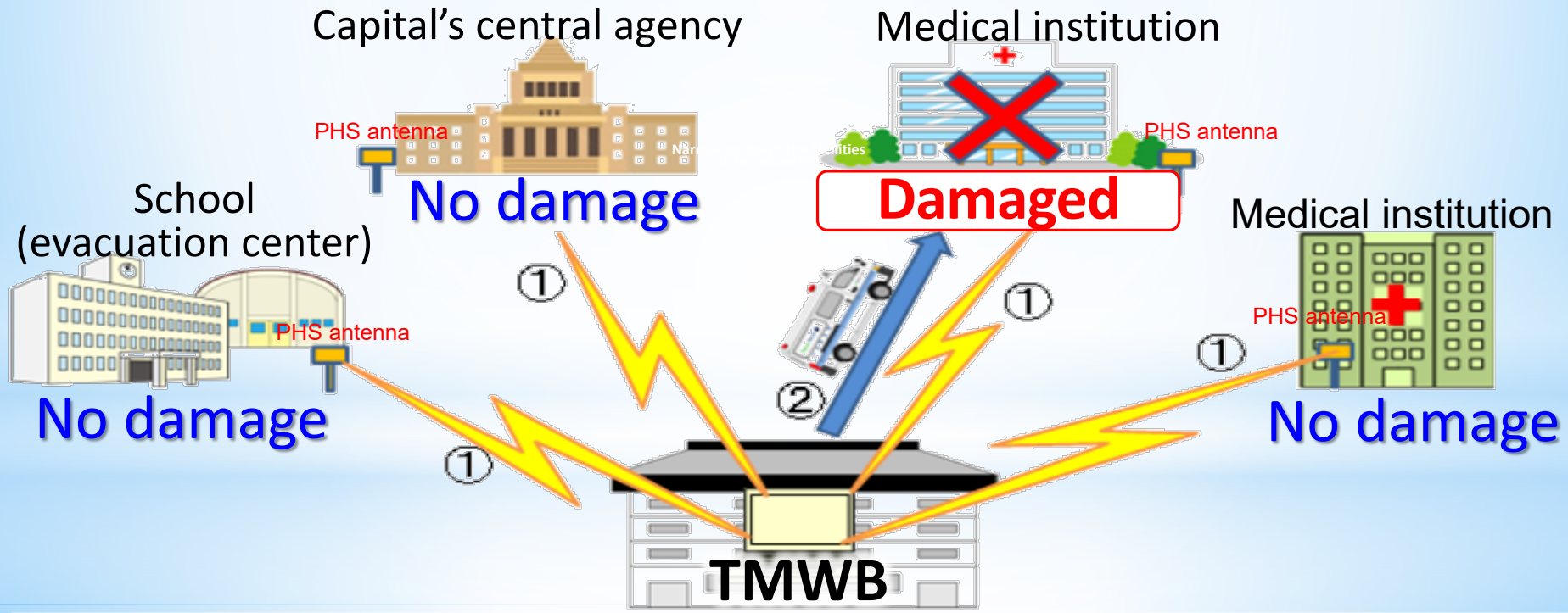


3. Conclusion

【Effects of introduction of the system 1/2】

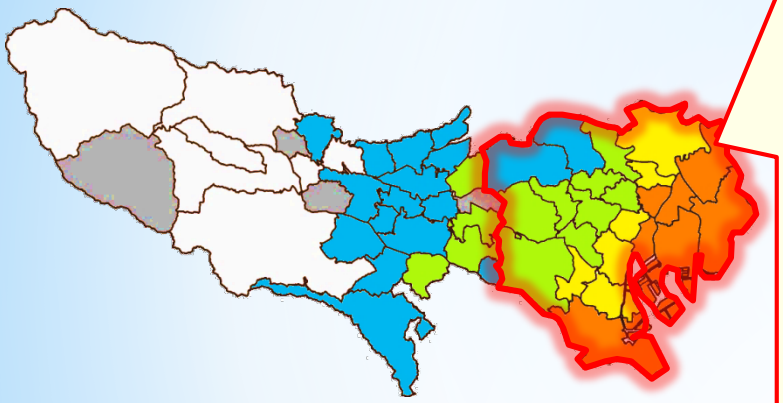
- **At the time of an earthquake disaster: Quickly identify facilities with decreasing water pressure**

  ⇒ Possible to narrow down target facilities



⊖ **PHS communication line** → **Narrowing down the facilities** → ⊖ **Going to the damaged facilities**

【Effect of introducing this system　2/2】



- **Metropolitan central agencies (115 facilities)**

→ In case of 58 facilities damaged by disaster

Before system introduction

63 hours

▲ **23 hours**

After system introduction

40 hours

(Reduction by 40%)

※ Drastic time reduction expected!

【Efforts in the future】

- **At the end of FY2017：**

  Introduce it to 140 facilities of the capital's central agencies.

- **Subsequently：**

  Introduce it to more than 800 key facilities, including medical institutions and refugee centers

（Further improvement in emergency measures）

We look forward to welcoming you at the IWA World Water Congress & Exhibition 2018 in Tokyo !

Auxiliary Slides

[Water pipes owned by Tokyo Metropolitan Waterworks Bureau]

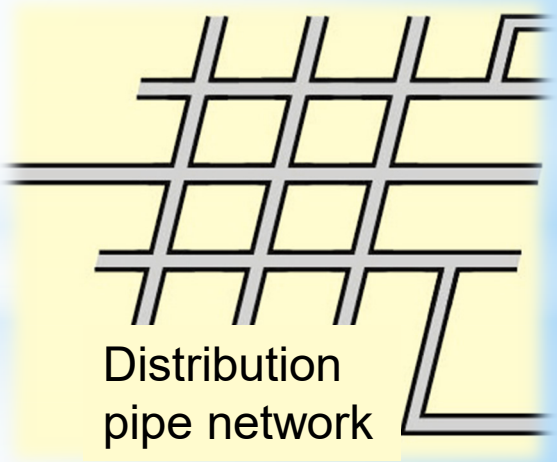
- Extension: Approximately 27,000 km

(Equivalent to approx. two thirds of the circumference of the Earth)

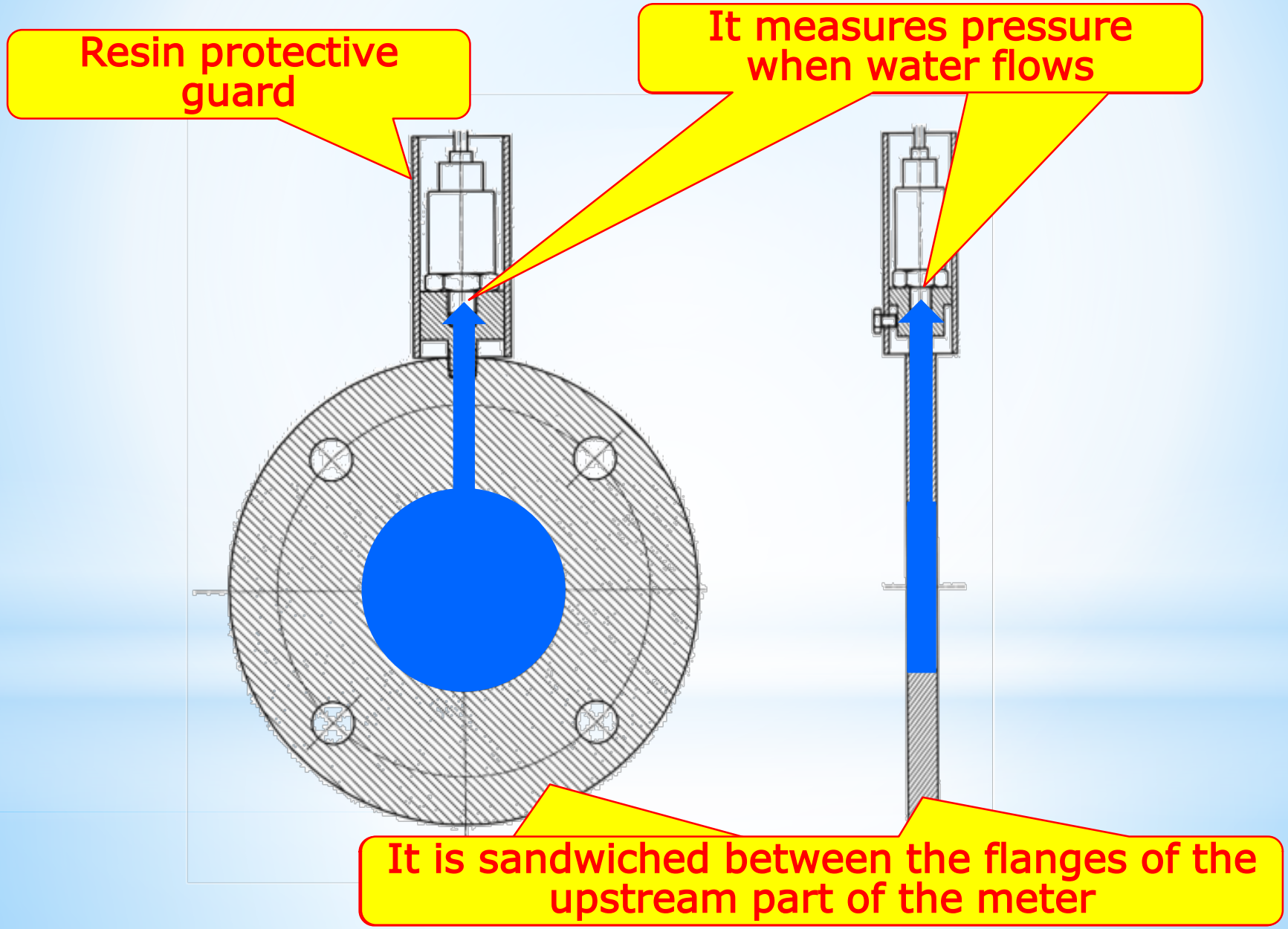
Water pipes are networked

↓ Even if they leak...

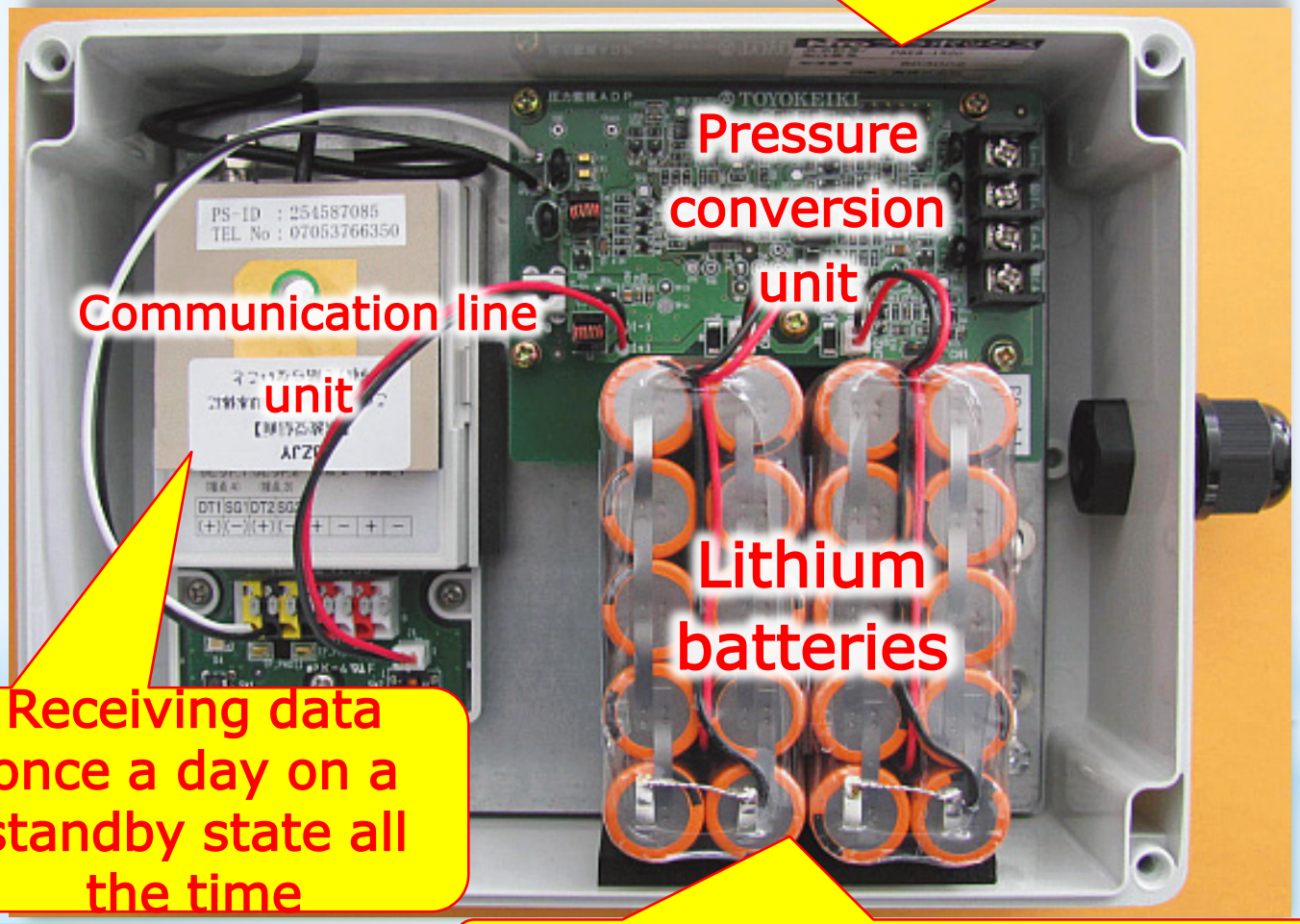
We can secure backup routes



《Pressure Sensor》

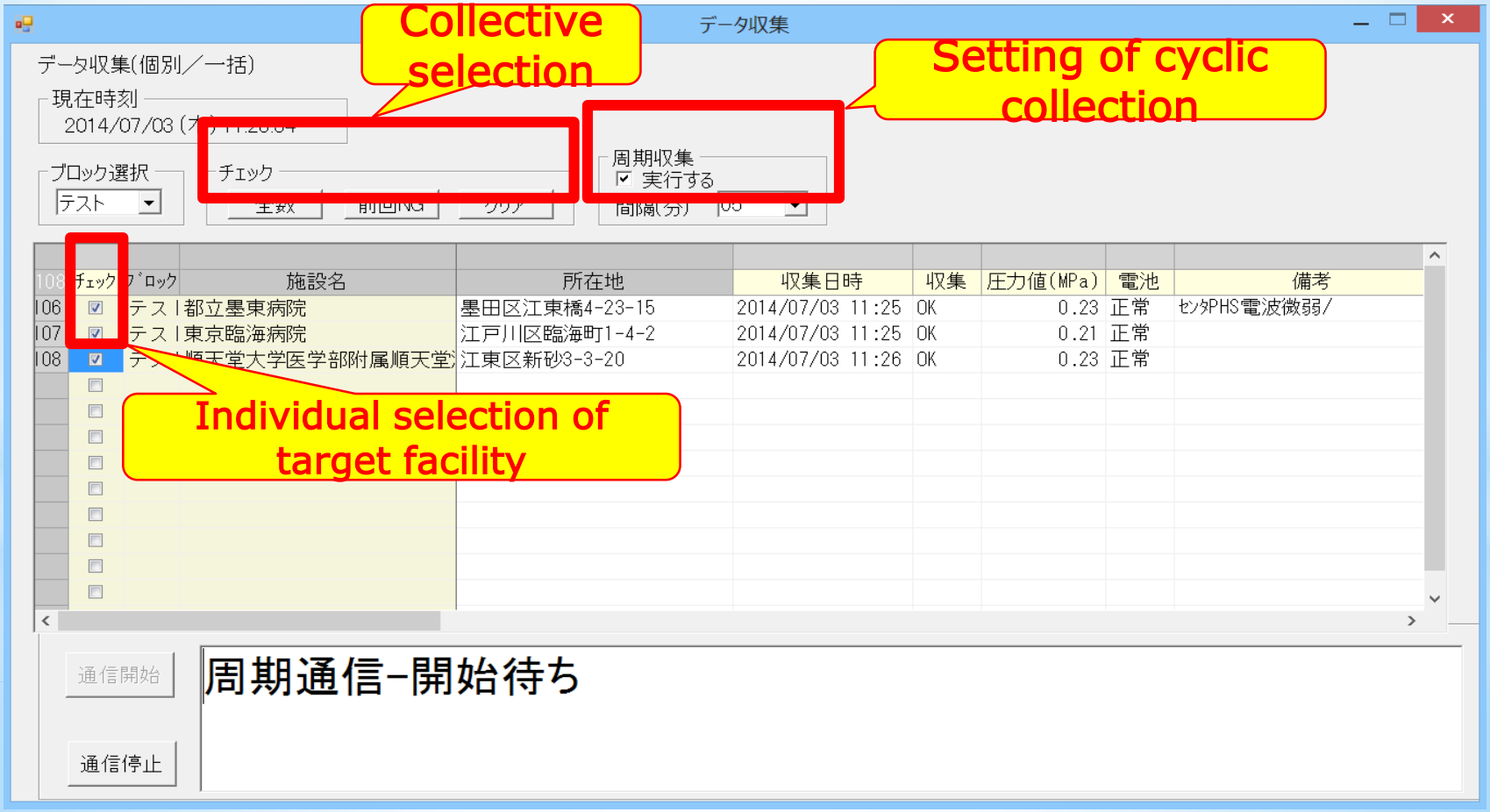


《Data conversion transmitter》



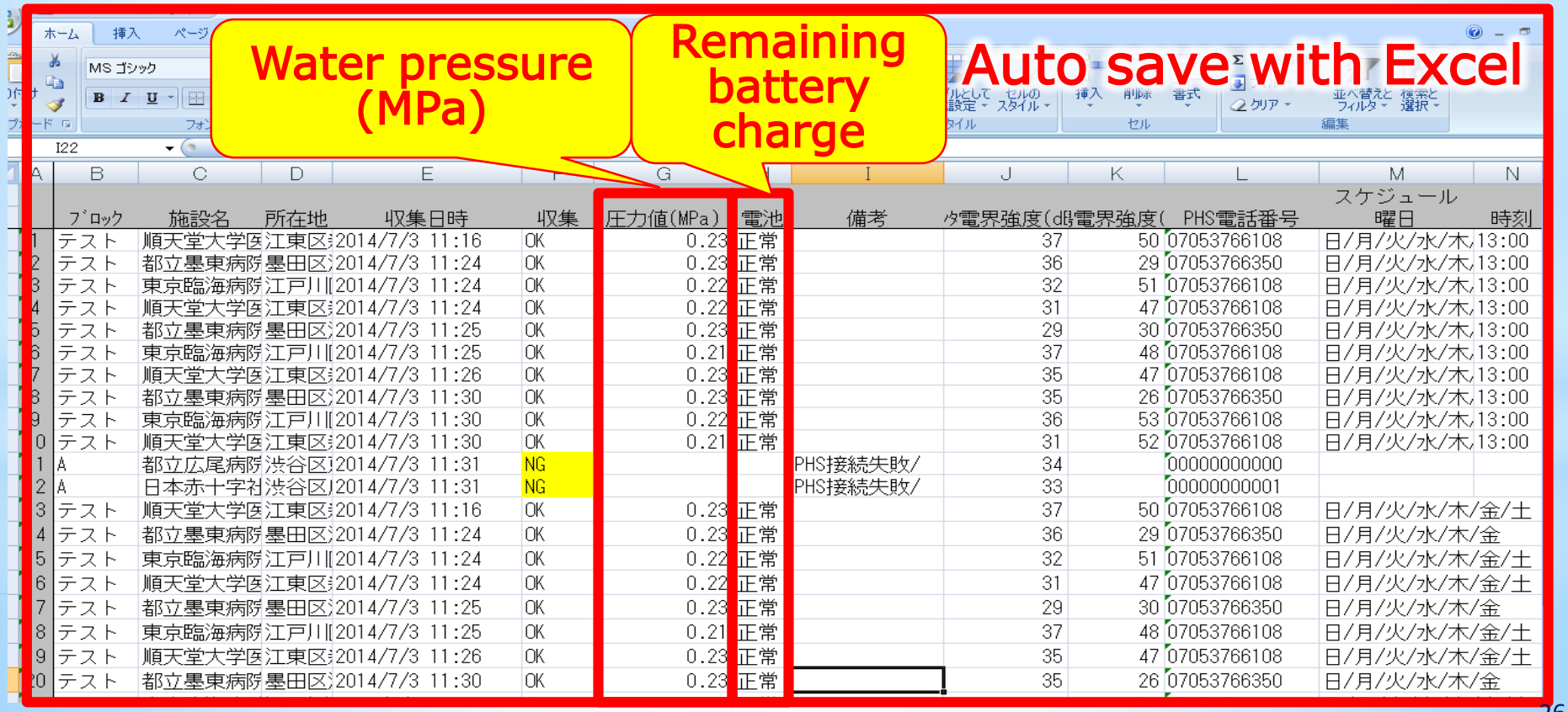
《Software functions 1/3》

Function 1 ： It is possible to collect water supply pressure values of required facilities collectively (Periodic collection at intervals of 1 min to 60 min also possible)



《Software functions 2/3》

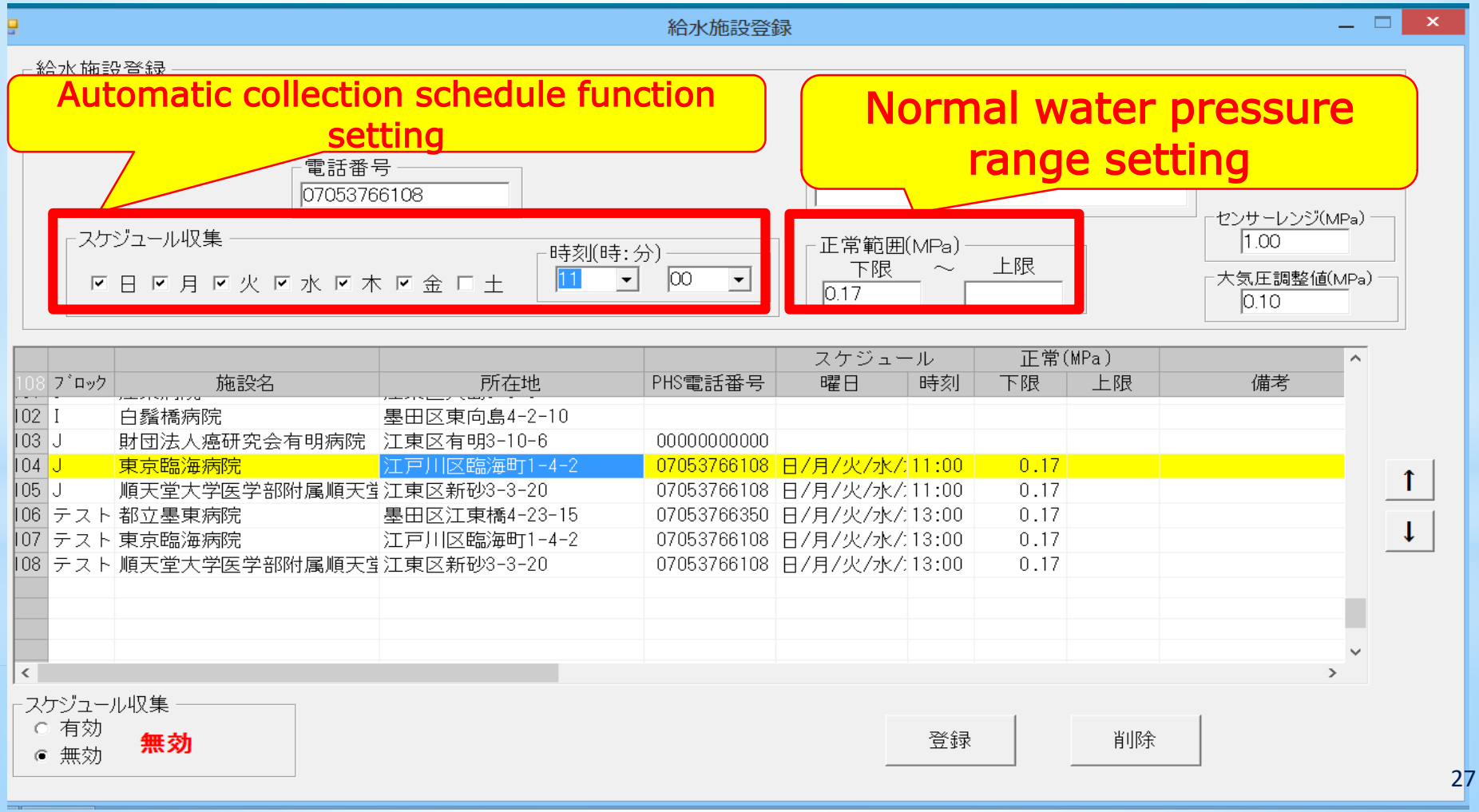
Function 2 ：Supply water pressure value, remaining battery level etc. can be measured at the same time and it can be automatically saved in Excel



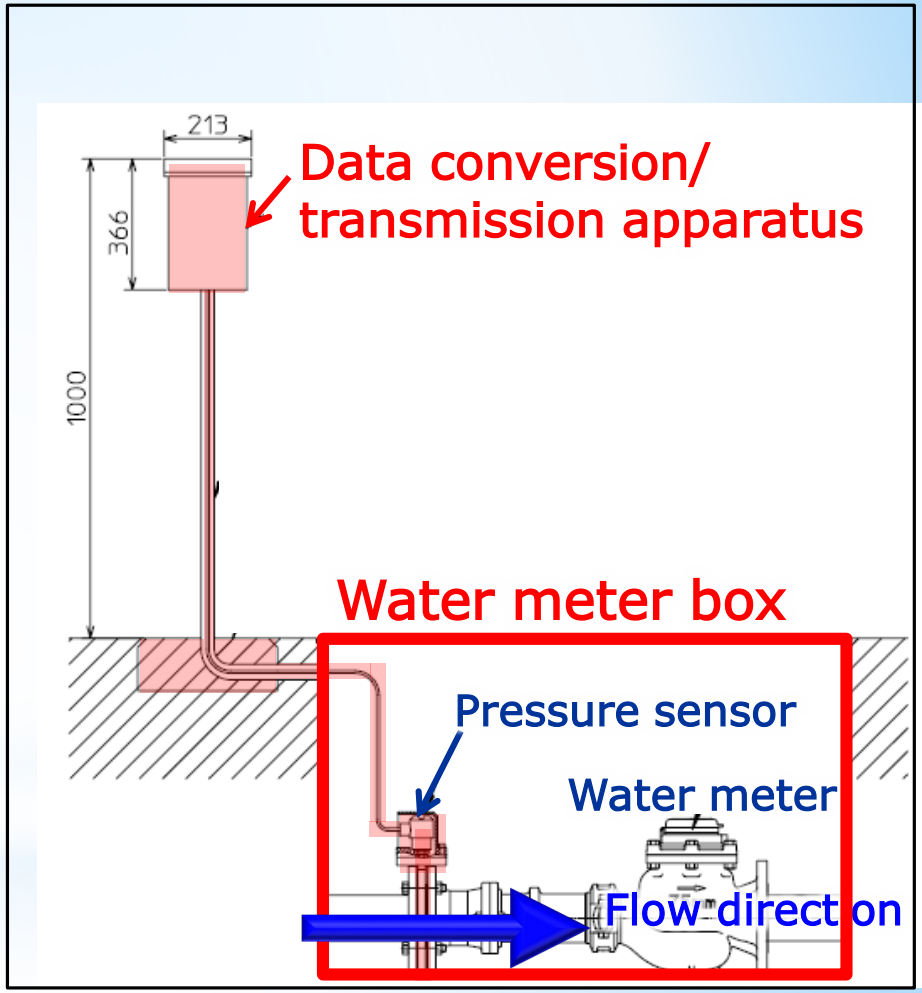
	ﾌﾞﾛｯｸ	施設名	所在地	収集日時	収集	圧力値(MPa)	電池	備考	ﾀ電界強度(dB	電界強度(	PHS電話番号	スケジュール 曜日	時刻
1	テスト	順天堂大学医	江東区	2014/7/3 11:16	OK	0.23	正常		37	50	07053766108	日/月/火/水/木/	13:00
2	テスト	都立墨東病院	墨田区	2014/7/3 11:24	OK	0.23	正常		36	29	07053766350	日/月/火/水/木/	13:00
3	テスト	東京臨海病院	江戸川区	2014/7/3 11:24	OK	0.22	正常		32	51	07053766108	日/月/火/水/木/	13:00
4	テスト	順天堂大学医	江東区	2014/7/3 11:24	OK	0.22	正常		31	47	07053766108	日/月/火/水/木/	13:00
5	テスト	都立墨東病院	墨田区	2014/7/3 11:25	OK	0.23	正常		29	30	07053766350	日/月/火/水/木/	13:00
6	テスト	東京臨海病院	江戸川区	2014/7/3 11:25	OK	0.21	正常		37	48	07053766108	日/月/火/水/木/	13:00
7	テスト	順天堂大学医	江東区	2014/7/3 11:26	OK	0.23	正常		35	47	07053766108	日/月/火/水/木/	13:00
8	テスト	都立墨東病院	墨田区	2014/7/3 11:30	OK	0.23	正常		35	26	07053766350	日/月/火/水/木/	13:00
9	テスト	東京臨海病院	江戸川区	2014/7/3 11:30	OK	0.22	正常		36	53	07053766108	日/月/火/水/木/	13:00
10	テスト	順天堂大学医	江東区	2014/7/3 11:30	OK	0.21	正常		31	52	07053766108	日/月/火/水/木/	13:00
11	A	都立広尾病院	渋谷区	2014/7/3 11:31	NG			PHS接続失敗/	34		00000000000		
12	A	日本赤十字社	渋谷区	2014/7/3 11:31	NG			PHS接続失敗/	33		00000000001		
13	テスト	順天堂大学医	江東区	2014/7/3 11:16	OK	0.23	正常		37	50	07053766108	日/月/火/水/木/金/土	
14	テスト	都立墨東病院	墨田区	2014/7/3 11:24	OK	0.23	正常		36	29	07053766350	日/月/火/水/木/金	
15	テスト	東京臨海病院	江戸川区	2014/7/3 11:24	OK	0.22	正常		32	51	07053766108	日/月/火/水/木/金/土	
16	テスト	順天堂大学医	江東区	2014/7/3 11:24	OK	0.22	正常		31	47	07053766108	日/月/火/水/木/金/土	
17	テスト	都立墨東病院	墨田区	2014/7/3 11:25	OK	0.23	正常		29	30	07053766350	日/月/火/水/木/金	
18	テスト	東京臨海病院	江戸川区	2014/7/3 11:25	OK	0.21	正常		37	48	07053766108	日/月/火/水/木/金/土	
19	テスト	順天堂大学医	江東区	2014/7/3 11:26	OK	0.23	正常		35	47	07053766108	日/月/火/水/木/金/土	
20	テスト	都立墨東病院	墨田区	2014/7/3 11:30	OK	0.23	正常		35	26	07053766350	日/月/火/水/木/金	

《Software functions 3/3》

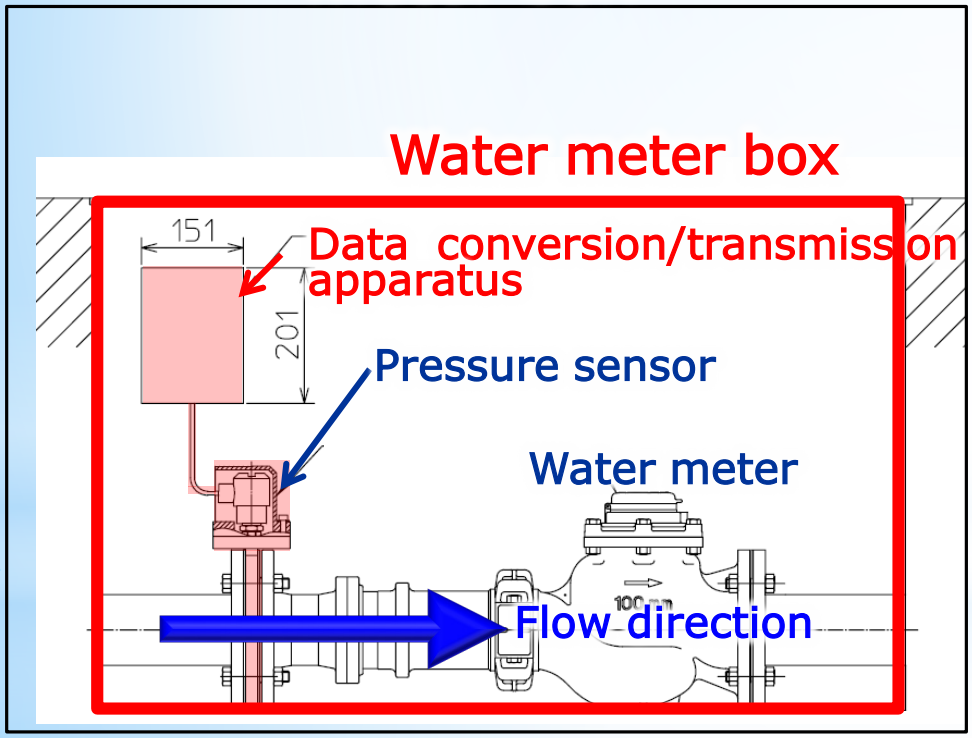
Function 3: It can set automatic collection schedule function and normal water pressure range for each facility.



Installed outside of the water meter box



Installed inside the water meter box



【Result of network proof test 1/2】

- Conduct communication confirmation for 6,549 times in total for 3 months after installation
- At first, communication failures occurred, but as a result of adding a retry function, all communication succeeded afterwards and the success rate hit 100 %