24th September 2020
Water and The Industries 2

Smart Solution for water supply in Tokyo

- Smart solution for water supply and control for the new Era -

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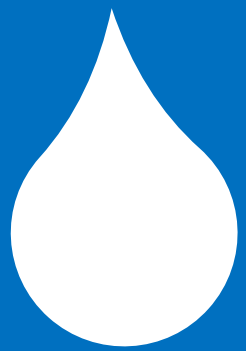
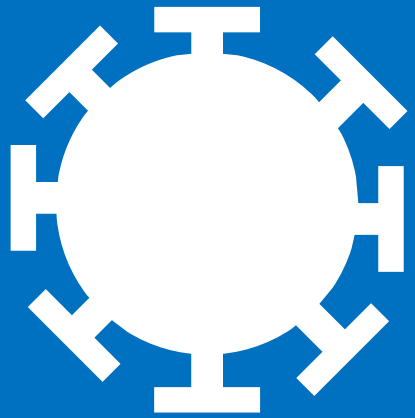
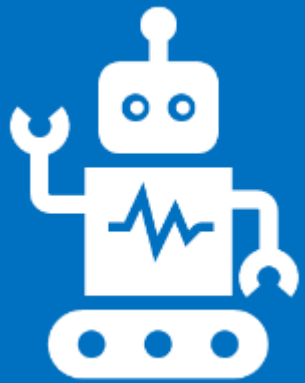


Water Leakage



COVID-19



ICT

Contents in detail

Water Leakage

Early detection

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ICT

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Open data

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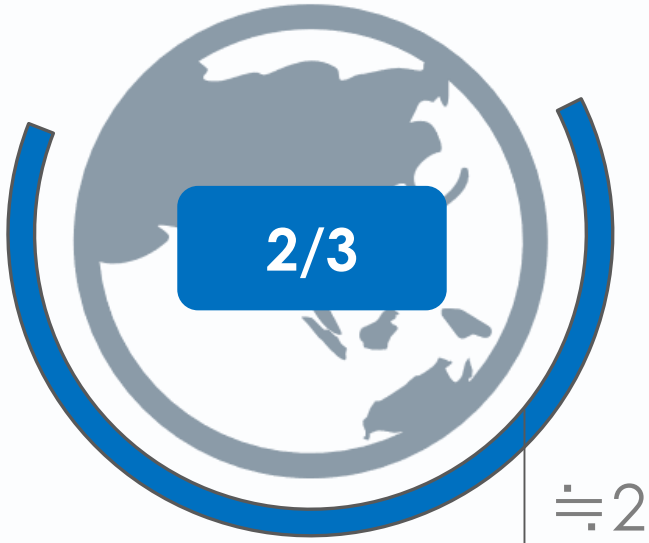
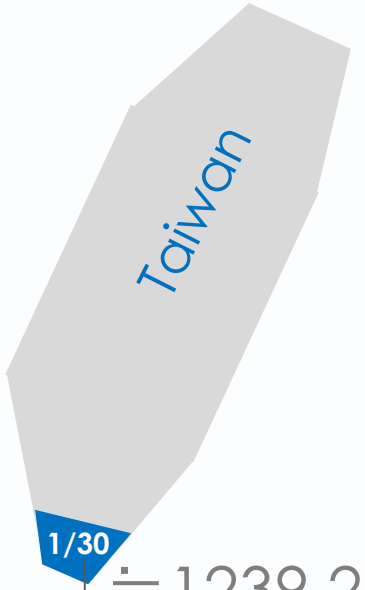
Overview of Tokyo waterworks

Distribution pipe



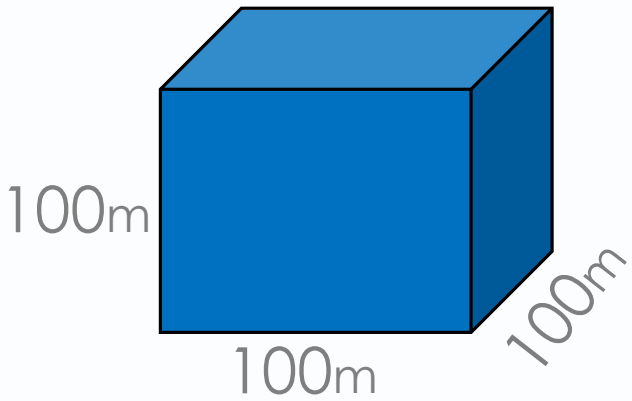
≒27,195 km

Water supply area



≒1239.27 km2

Water distribution volume /year

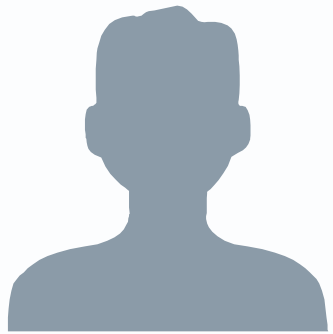


×1,541

Leak repairs /year

×8,006

Staff member



×3,747

(2018 FY)

How to reduce water leakage

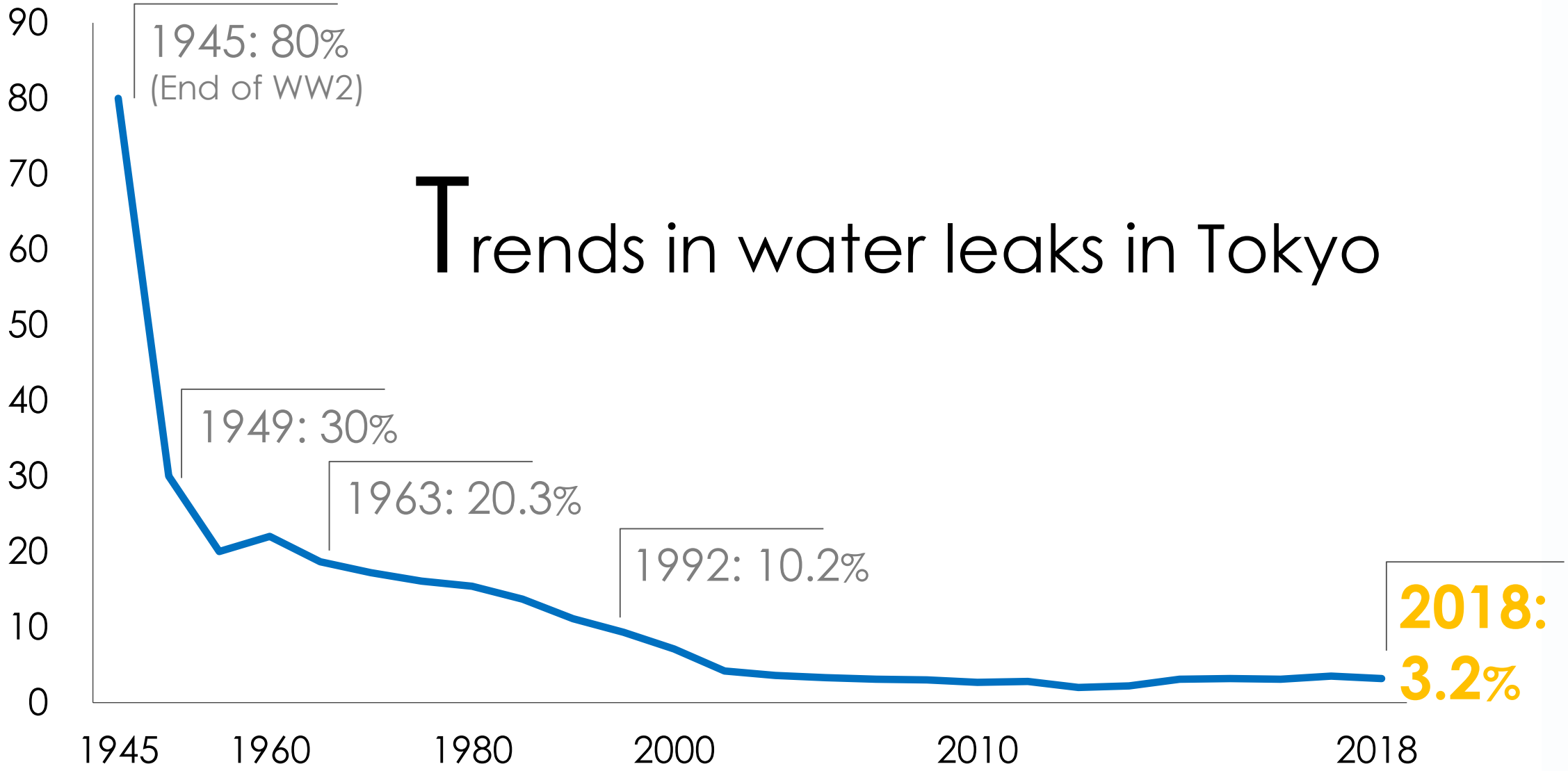
Which is the correct leakage rate about in Tokyo?

A : 20%

B : 10%

C : 3%

How to reduce water leakage

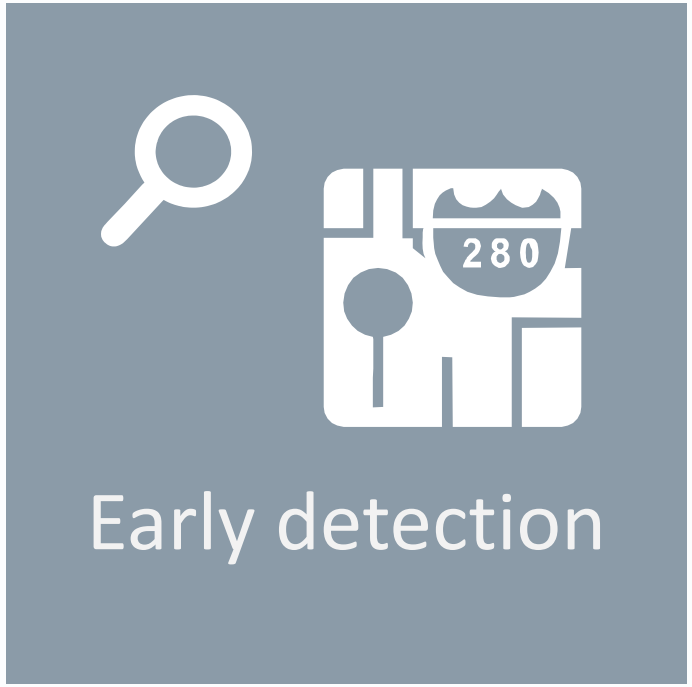


How to reduce water leakage – current countermeasure -

Planned work

Observation survey works

➢Early detection and repair of underground leaks



How to reduce water leakage – current countermeasure -

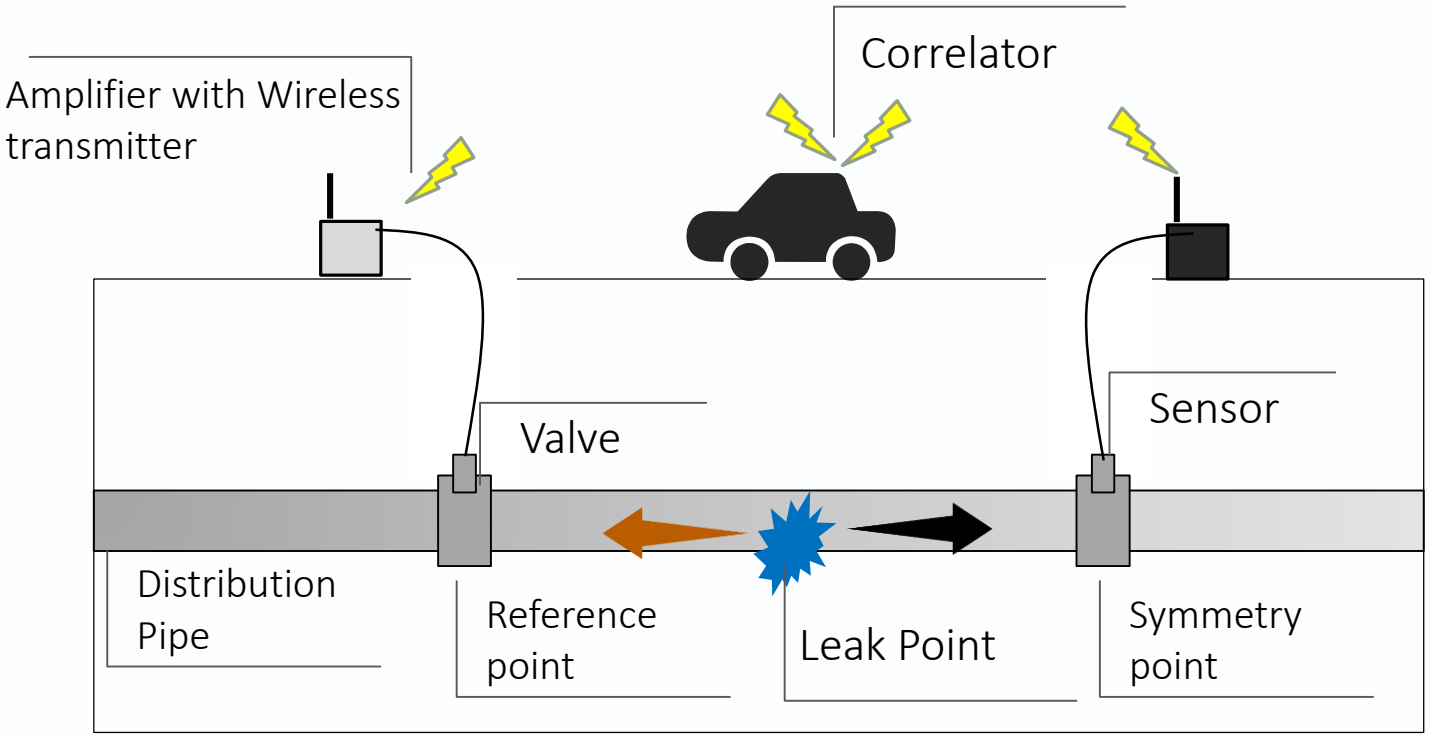
Survey with acoustic bar

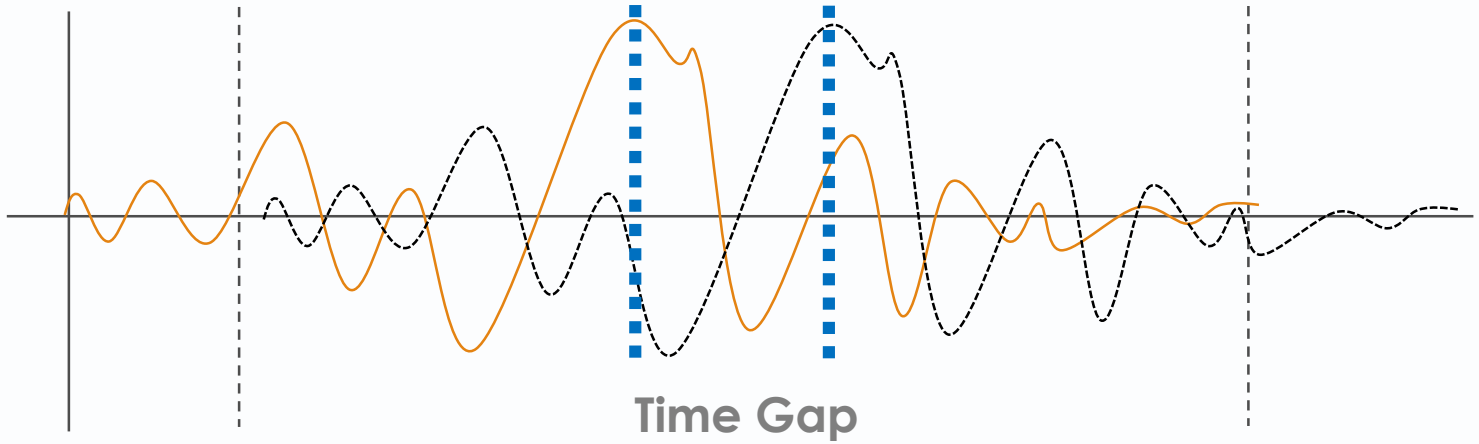
Checking leaks from service pipe with acoustic bar

Surveys with electronic detector

Specify the location of leaks from distribution pipe with electronic detector

How to reduce water leakage – current countermeasure -





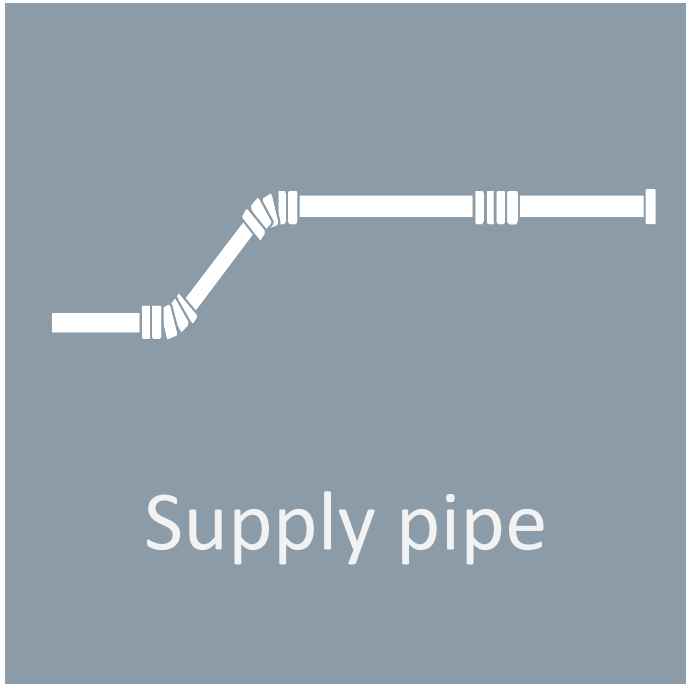
Correlation Leak Detector

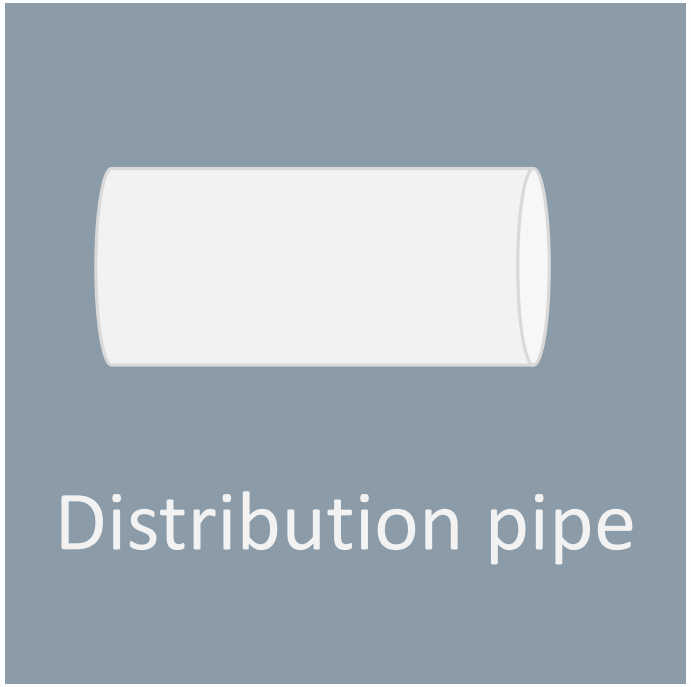
Specify the location of a leak by the time gap takes to reach 2 points sensor

How to reduce water leakage – current countermeasure -

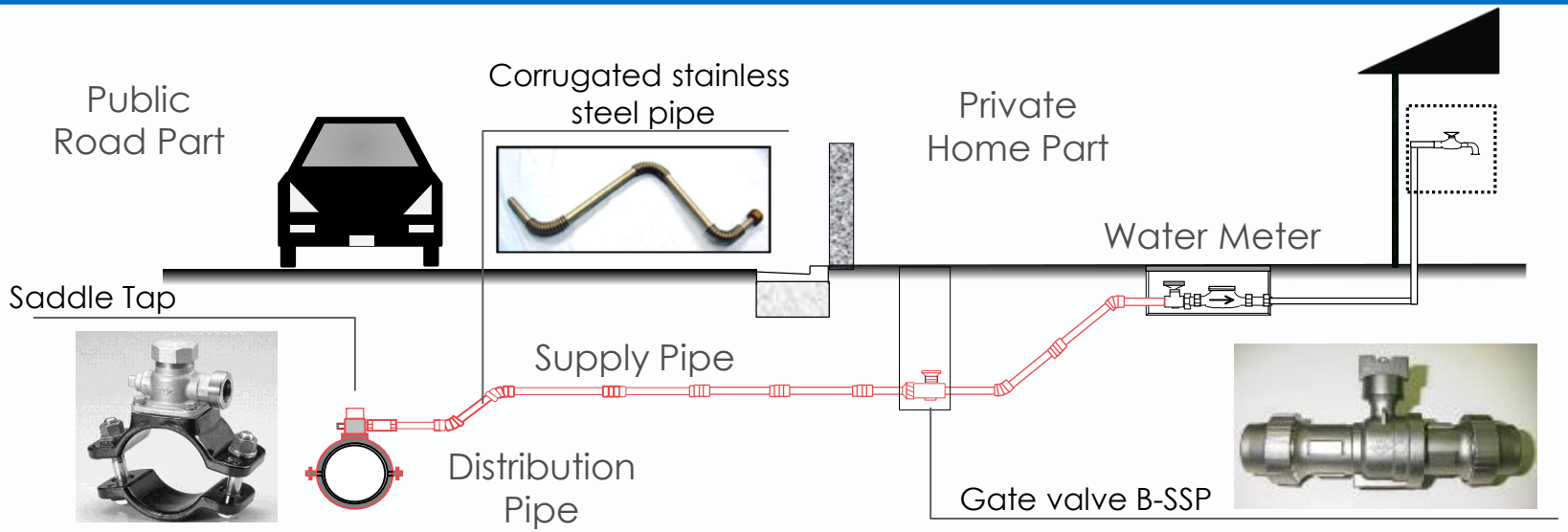
Improving pipe material

- Supply pipe and distribution pipe



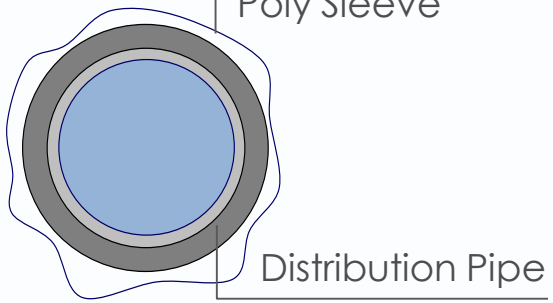


How to reduce water leakage – current countermeasure -



Improving supply pipe

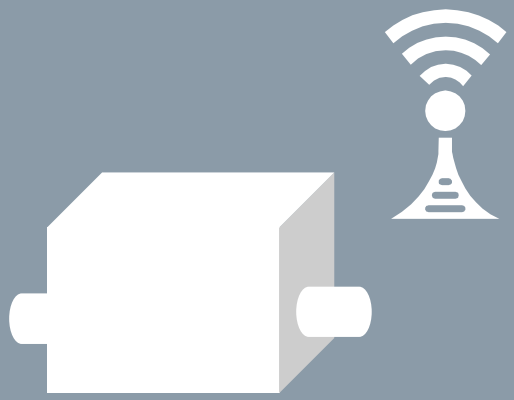
Replacing lead pipes with stainless steel pipes from distribution pipe outlets to the meter



Improving distribution pipe

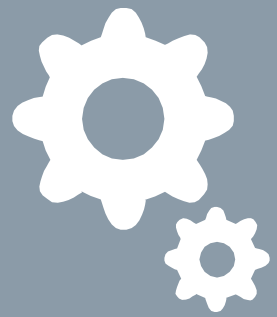
Replacing weak cast iron pipes with ductile cast iron pipes, preventing corrosion with poly sleeves

How to reduce water leakage – Future plan-



Smart meter

New detector



Combine all data

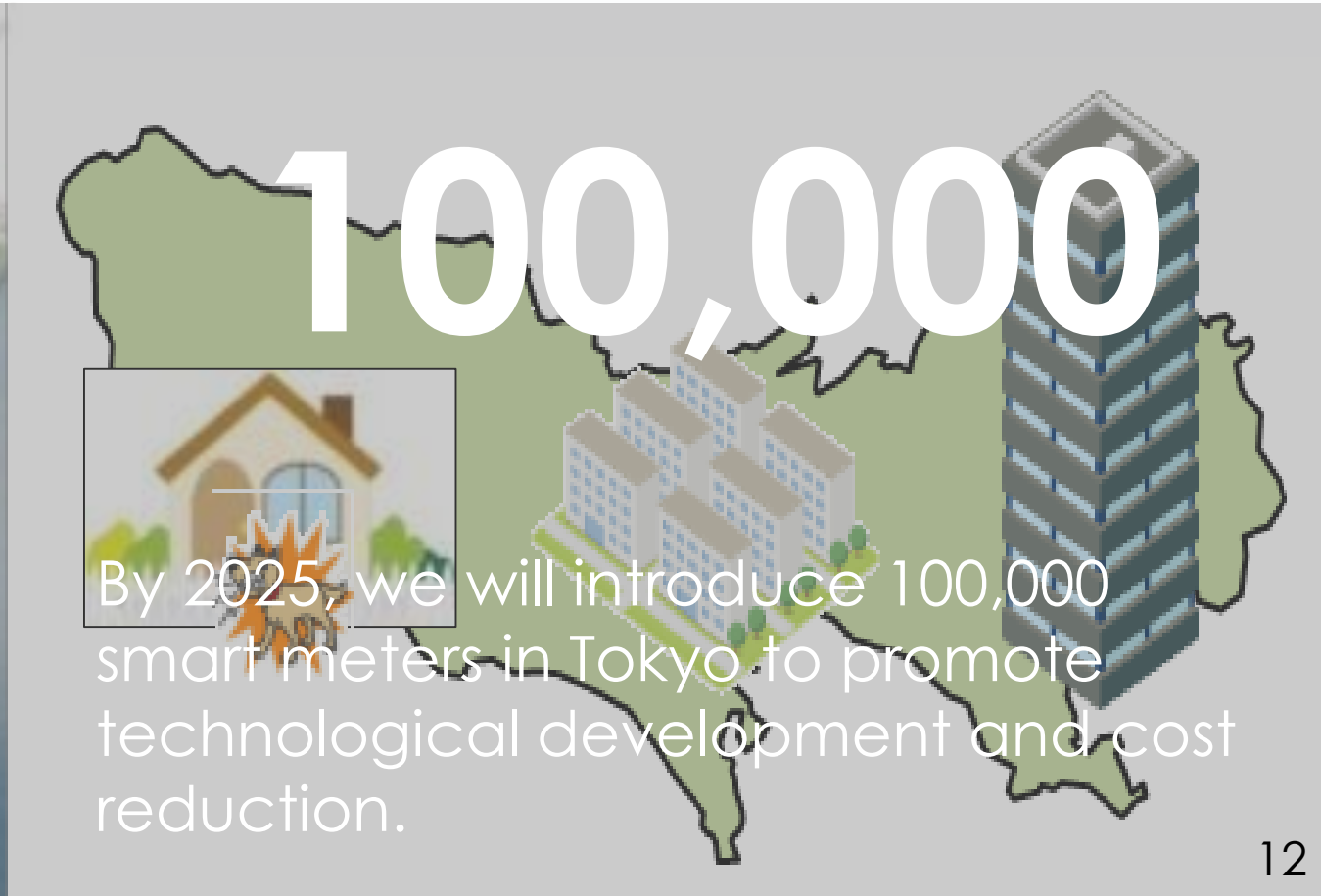
How to reduce water leakage – Future plan-

Smart meter

In addition to the 6,000 unit model project in HARUMI area, we have also made a trial project to introduce smart meters to 100,000 units by 2025

6,000

In HARUMI area, where the Olympic Village will be renovated into housing, we will implement a smart meter model project with Tokyo Electric Power Company.

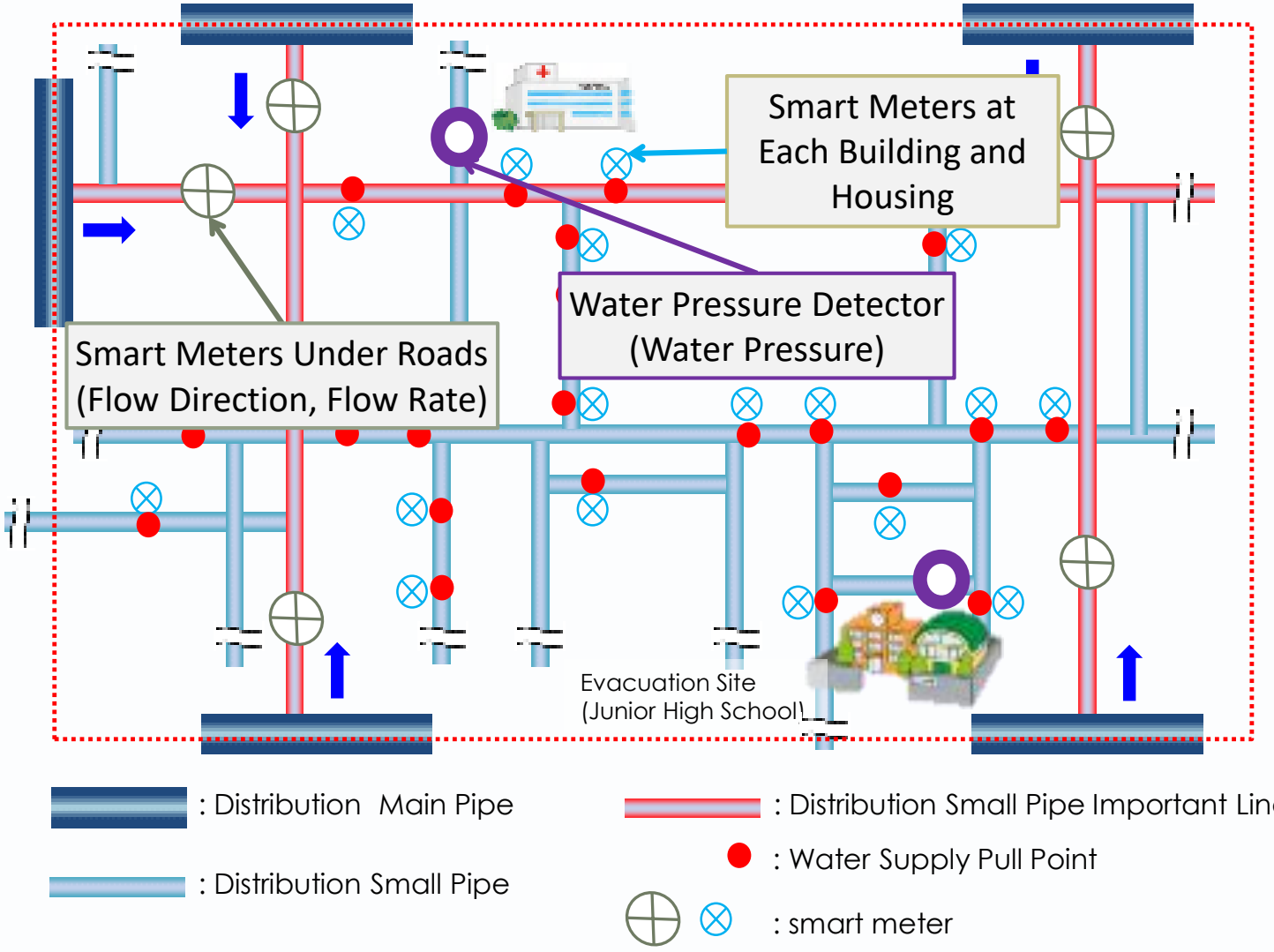


100,000

By 2025, we will introduce 100,000 smart meters in Tokyo to promote technological development and cost reduction.

How to reduce water leakage – Future plan-

Image of demonstration experiment

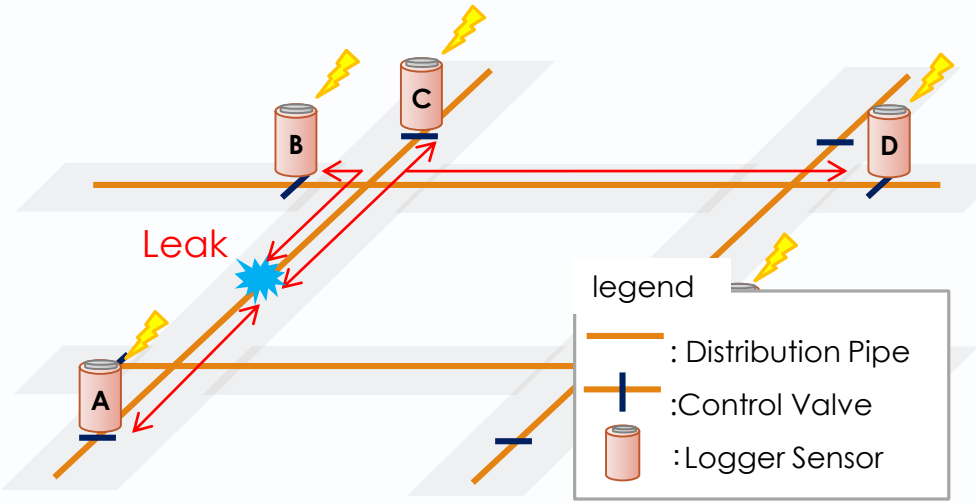


We conducted demonstration experiments using data from smart meters installed in multiple areas in Tokyo for maintenance and management of pipelines.

How to reduce water leakage – Future plan-

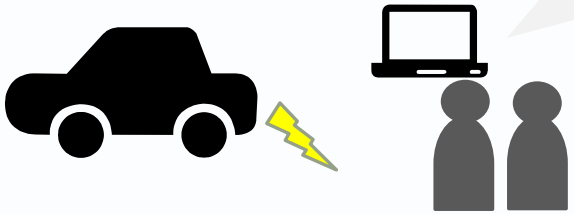
Multipoint correlation water leak detector

In order to improve the efficiency of water leak investigation and early detection of pipe accident, we will introduce a water leak investigation method using multipoint correlation water leak detectors.

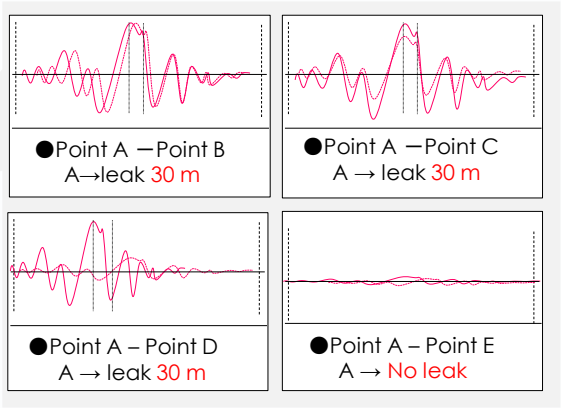


Current plan to introduce

Collect data in the field, enabling wide range survey of water leaks

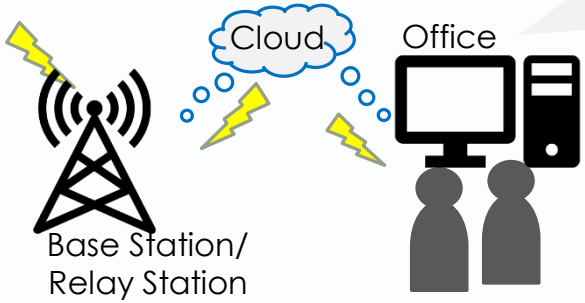


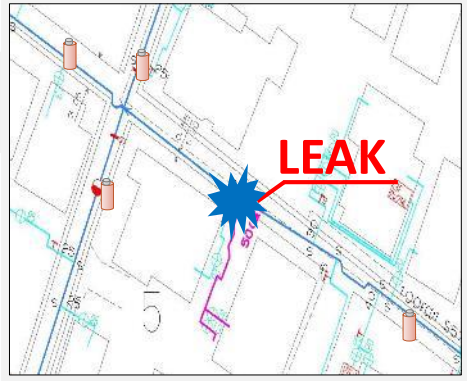
Collect and analyze data in the field



Future plan

Collect data in the cloud, enabling continuous monitoring of leaks on maps



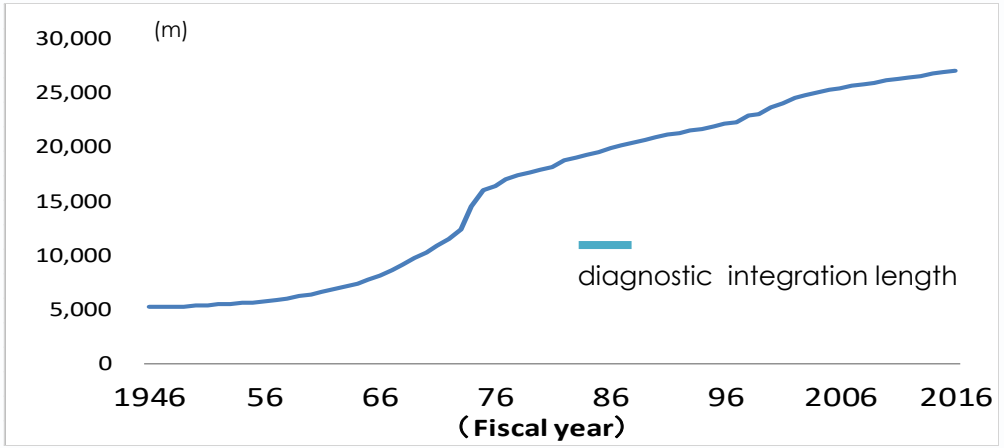


How to reduce water leakage – Future plan-

Build a comprehensive pipeline maintenance system

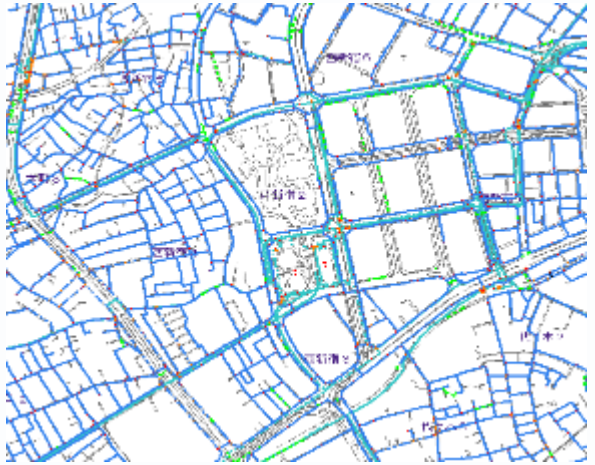
Makes it possible to grasp weak areas of the pipe network by correlating with more detailed regional pipe health and accidents

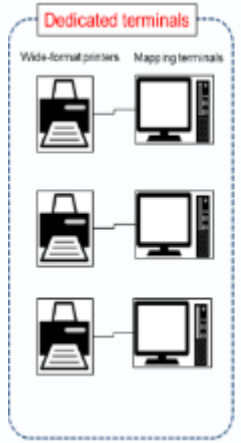
The data from pipeline diagnostic work

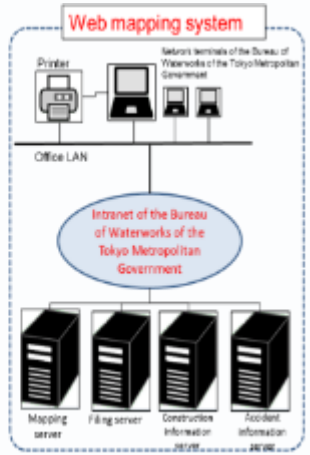


Type	Total point
Gate valve	385,832
Air valve	15,910
Drain valve	10,886
Fire hydrant	132,616
Vertical shaft	316
Tele-meter	315
Total length of Aqueduct bridge(m)	1,804

GIS System

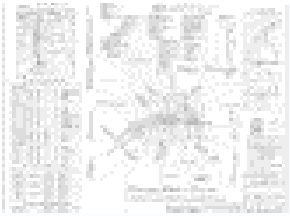




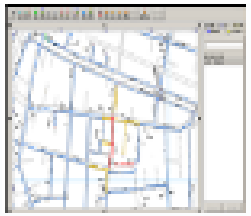


Main functions of GIS system

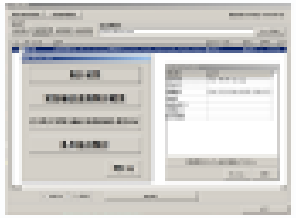
Mapping function



Filing function



Suspension and turbidity simulation function



Totalization function

How to reduce water leakage – Future plan-

P

Developing a rehabilitation plan
Pipeline diagnosis work plan

- Developing next rehabilitation plan and pipeline diagnosis plan according to verification

D

Implementation of projects
On-site response

- Implementing projects such as pipeline rehabilitation, facility replacement
- Implementing pipeline diagnosis and function investigation
- On-site response to accidents

ICT

Man-power

A

Analysis and verification by the system

- Analysis of accident related factors
- Efficient analysis of big data
- Multifaceted analysis using new insights
- Verification according to analysis

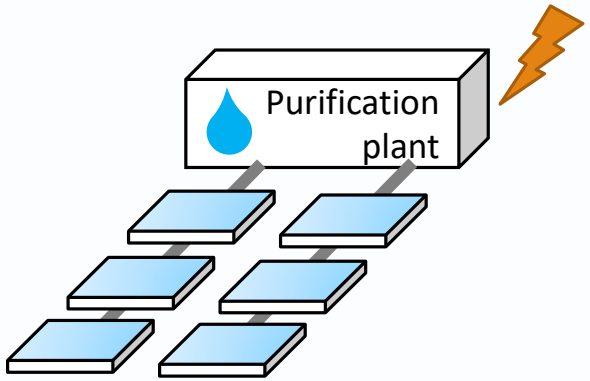
C

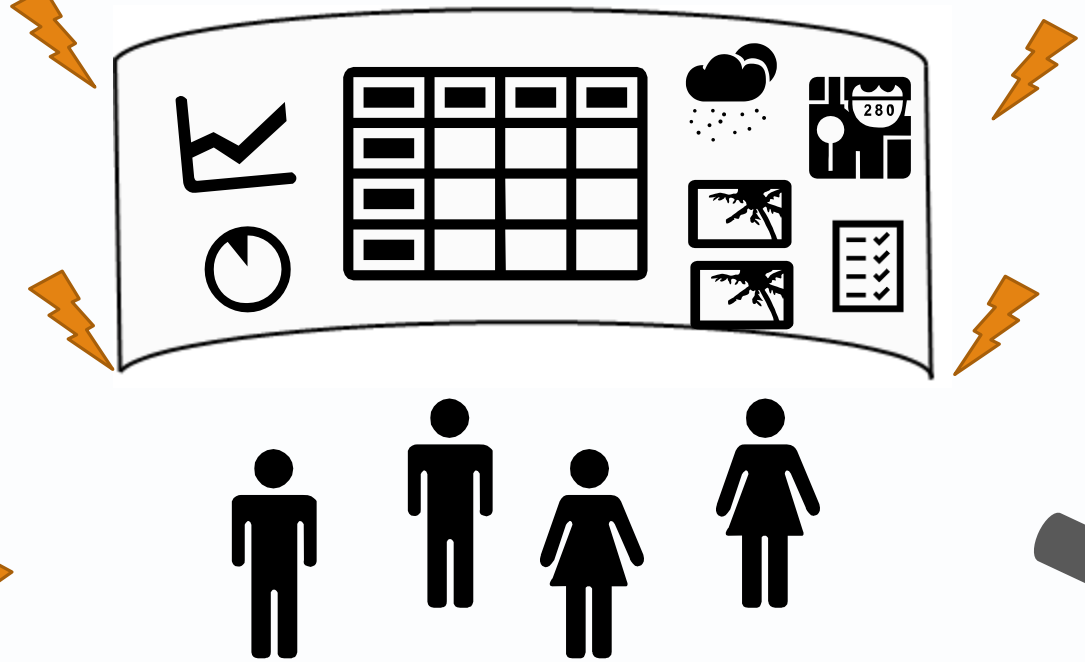
Progress management
Utilizing data in the system

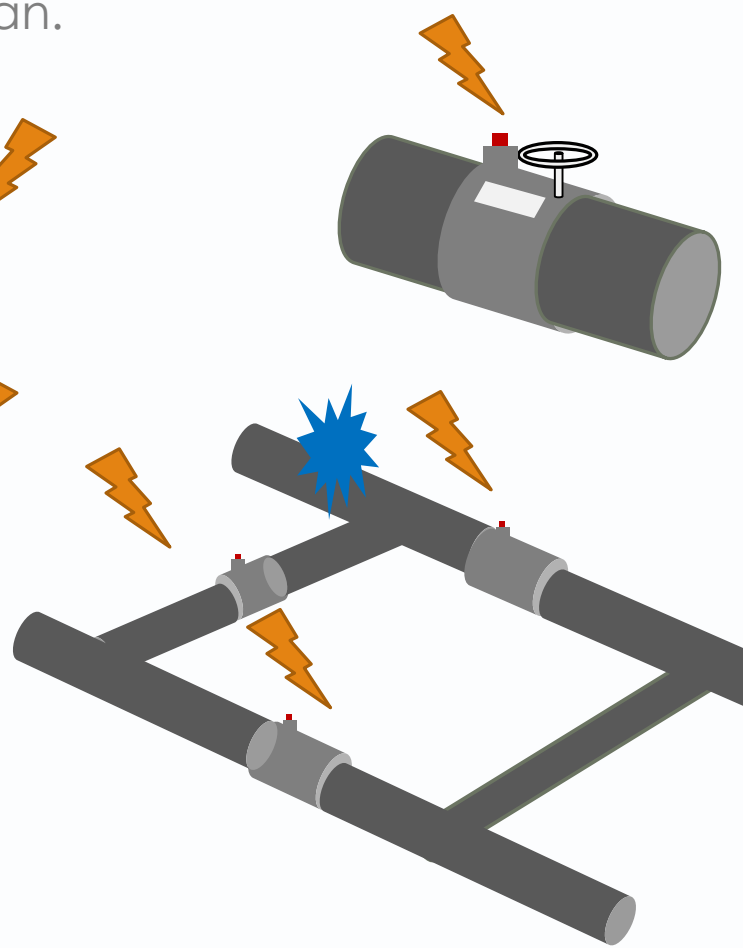
- Managing progress of projects such as pipeline rehabilitation, diagnosis and investigation
- Inputting data on the status of pipeline rehabilitation and diagnosis outcomes into the GIS system

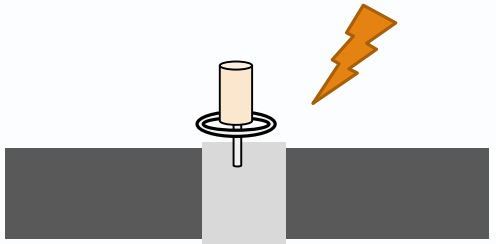
How to reduce water leakage – Future plan-

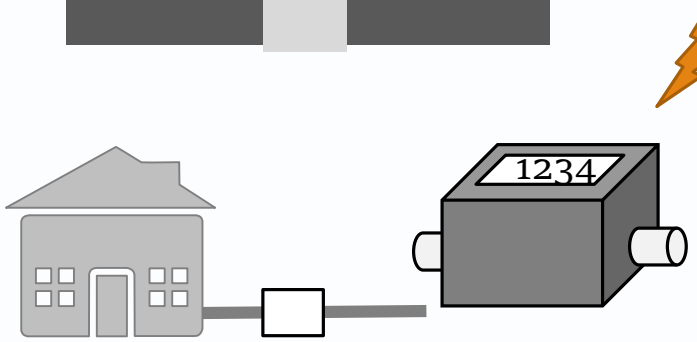
All information will be collected, which enable us to analyze various data and develop plan.











Sensors in pipes, valves and smart meters transmit data to the main office.

In case of leakage accidents, this system shows which valves should be operated.

Countermeasures against COVID-19

Prevent from virus

- Remote work, Staggered commute, Promoting

Remote work

Stagger commute

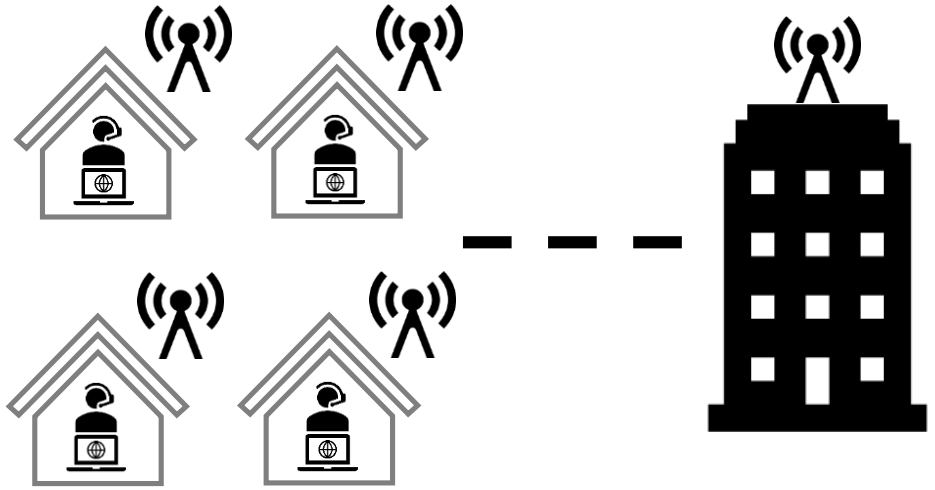
Promoting

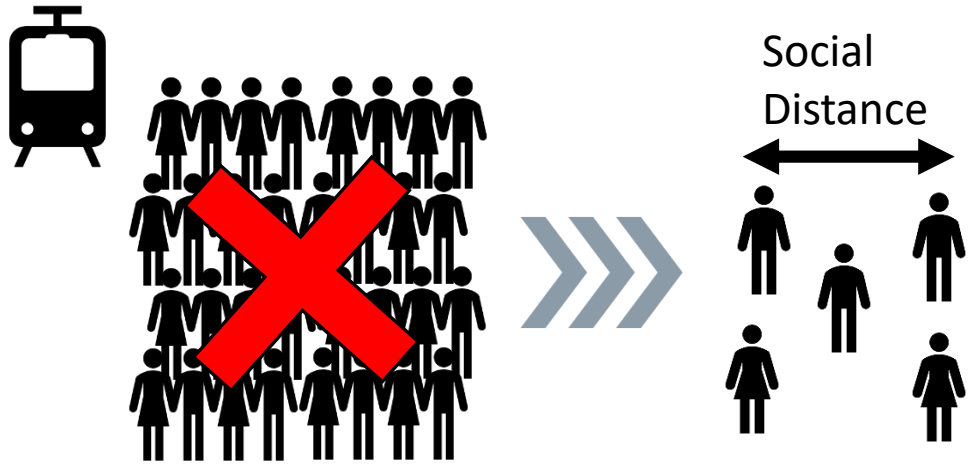
Countermeasures against COVID-19

Remote work and staggered commute

Laptops has been distributed to the main office staff from February 2020 and remote work has begun in March.

In addition, many staff changed their working hours in order to avoid congestion on public transport.

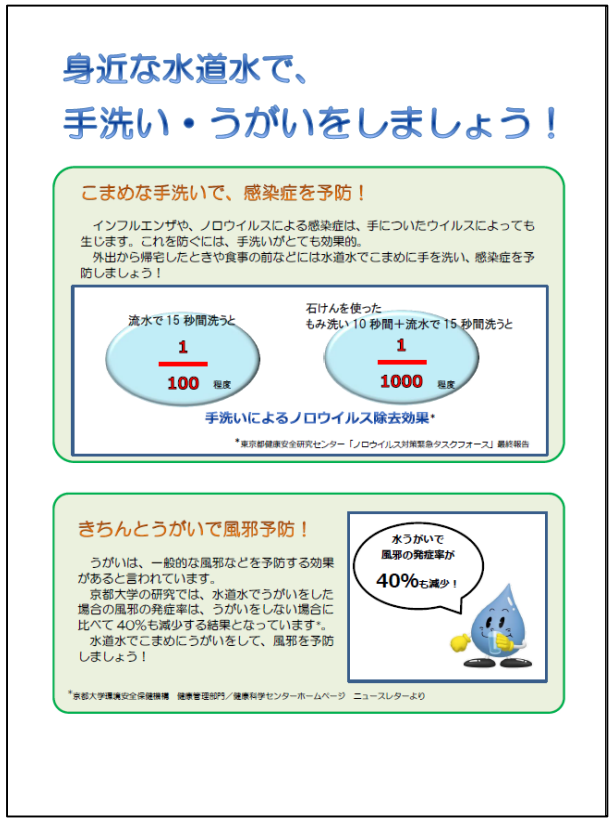




Countermeasures against COVID-19

Promote washing hands

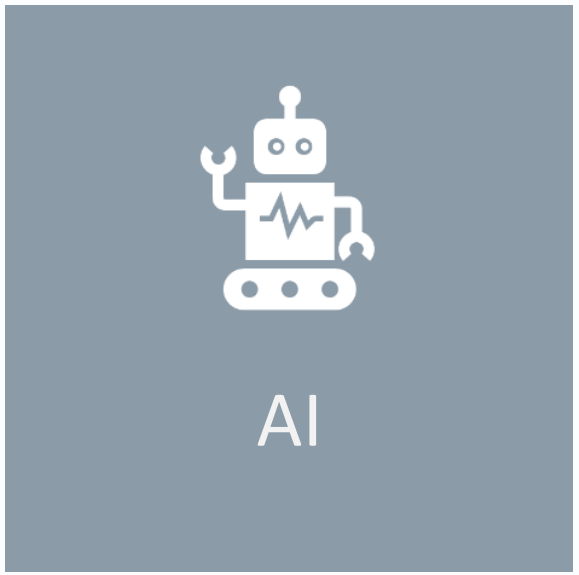
We actively promote education on the effectiveness of hand washing and gargling with tap water as a way to prevent infectious diseases .



Countermeasures with ICT

Active use of ICT

- Cashless payment, Browse/Apply via the Internet, Open data, AI



Countermeasures with ICT

Cashless payment

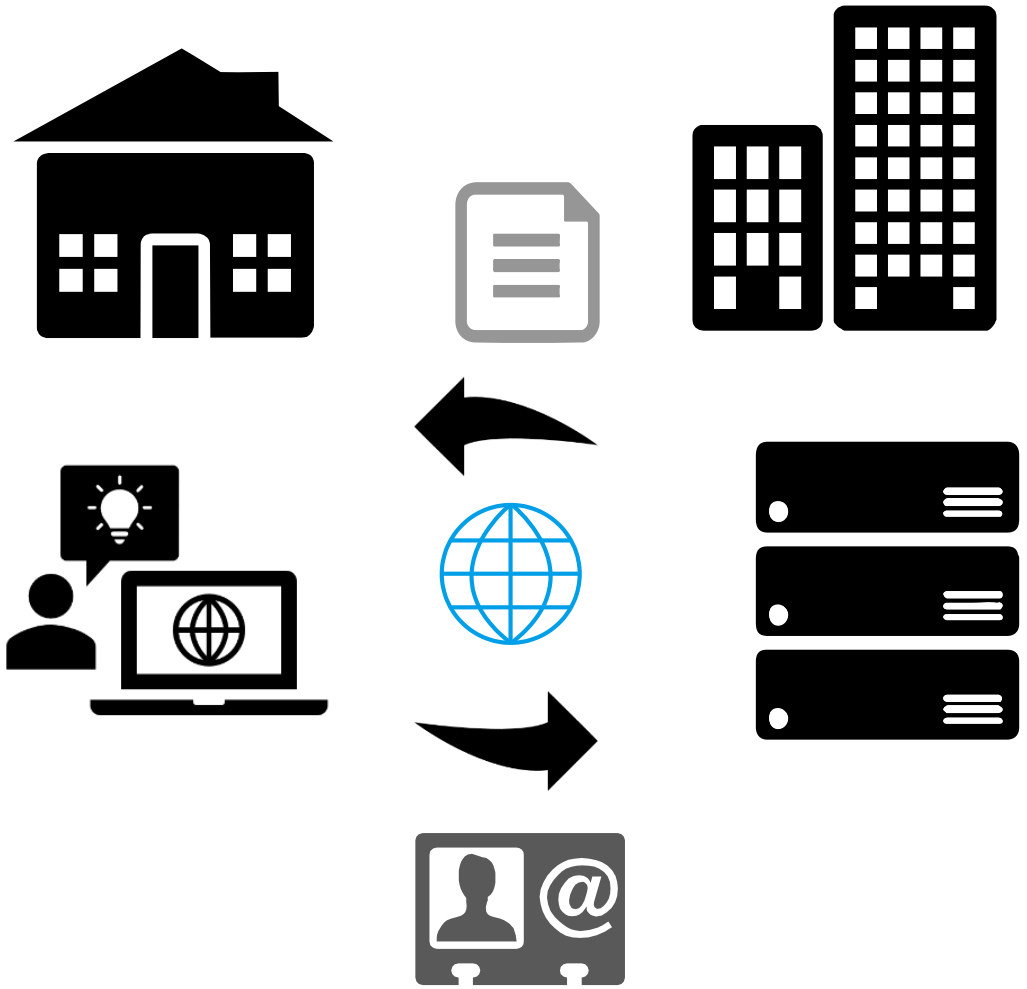
You can read the QRcode on your bill with your smartphone and make a payment with electronic money.
You can make a cashless payment anywhere with a simple operation.

Countermeasures with ICT

Browsing via the Internet

In the past, plumber used to visit our office to browse water piping drawings on paper.
Now they can search, view and print the drawings in their office through the Internet.

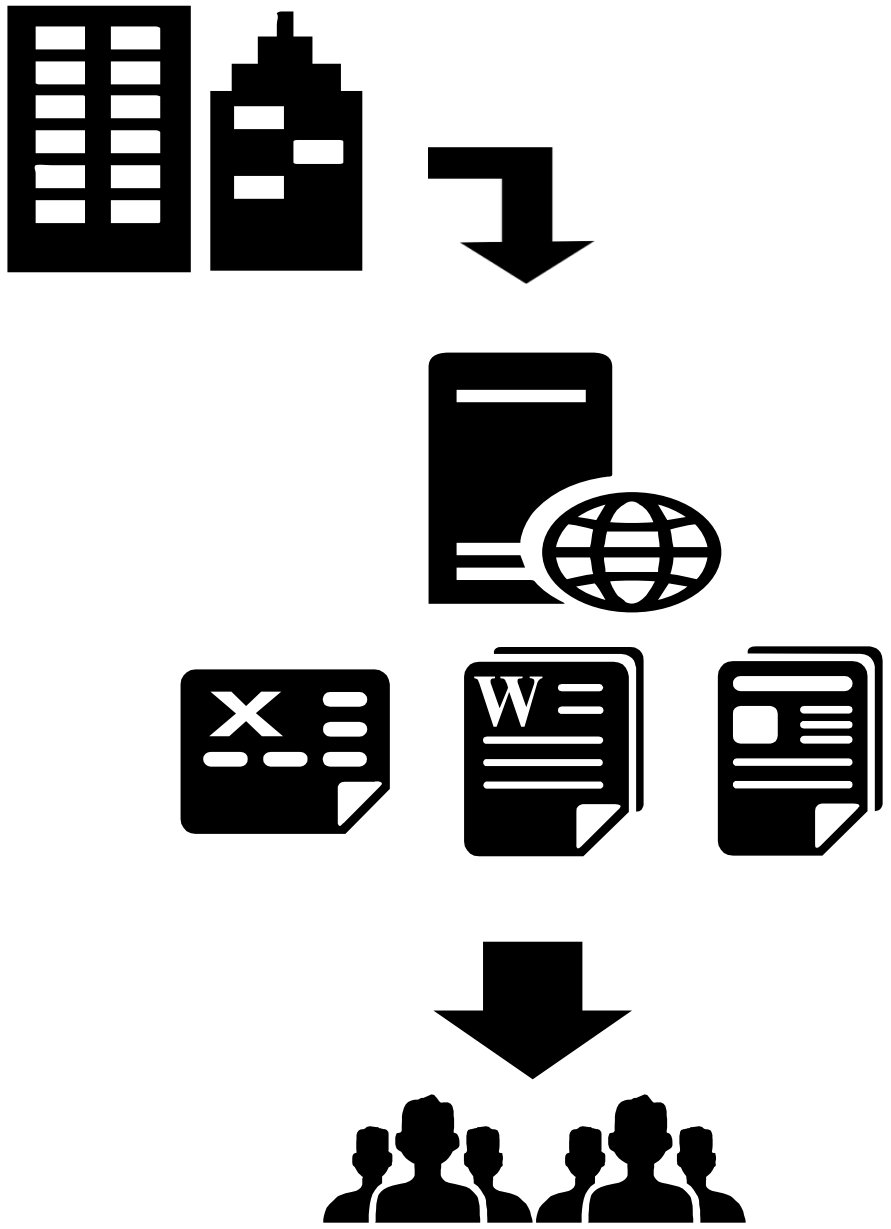
Countermeasures with ICT



Application via the Internet

Previously, Plumber were asked to visit our office for piping assessment, but now they can apply for the assessment via the Internet.

Countermeasures with ICT

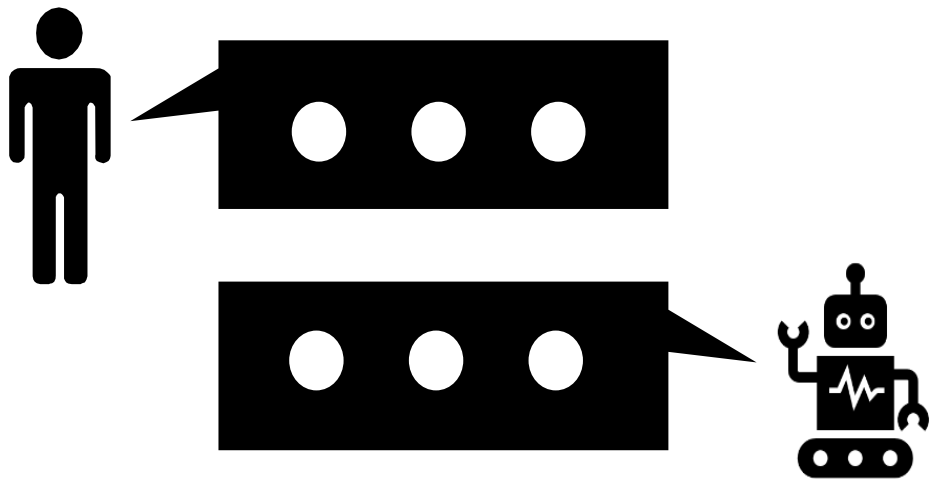


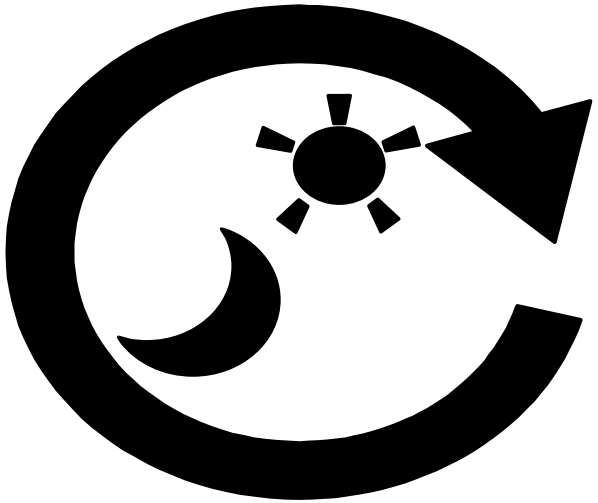
Open data

Tokyo government provides administrative data for the administration transparent and improving services for residents.

The Waterworks Bureau provides various reports, water quality measurements and standards available to the public.

Countermeasures with ICT





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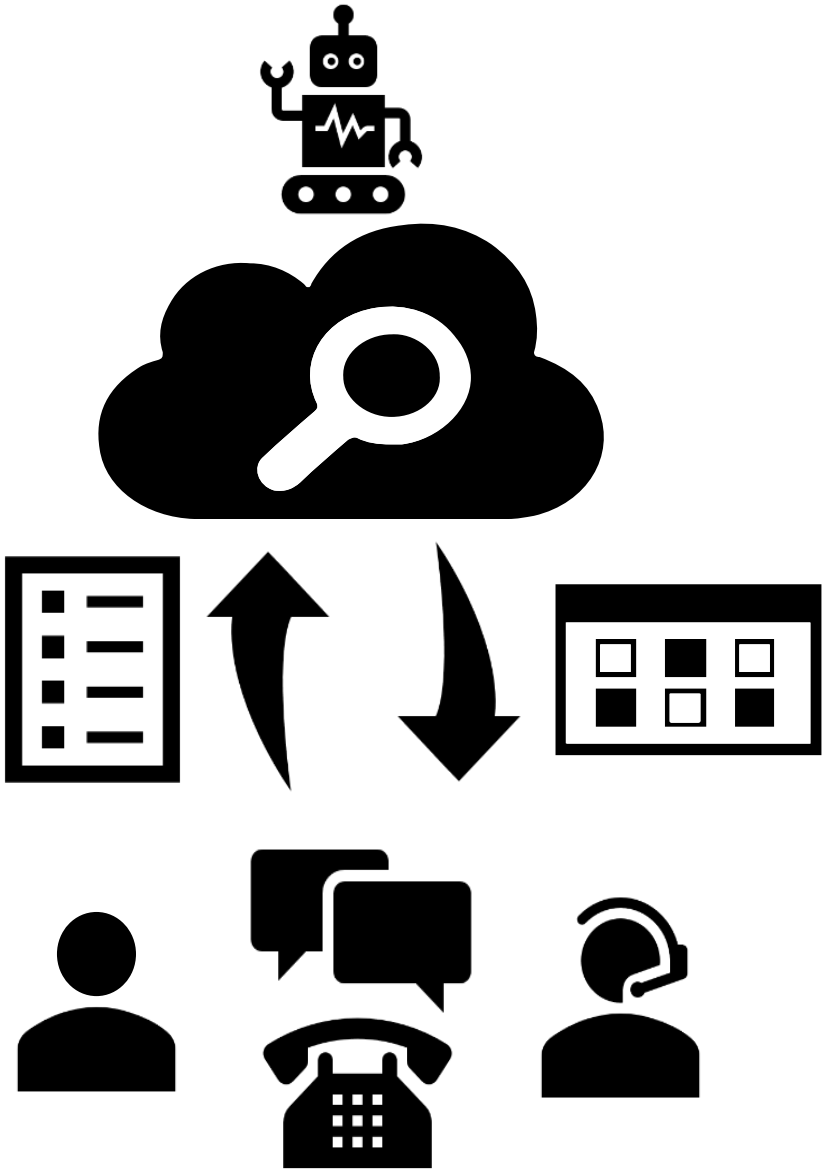
Chat-bot

We have released an AI-powered chat-bot on our webpage to answer customer questions 24 hours. By clicking on the icon and typing in a question, the AI chat-bot understands the meaning of question and answer it automatically.

Countermeasures with ICT



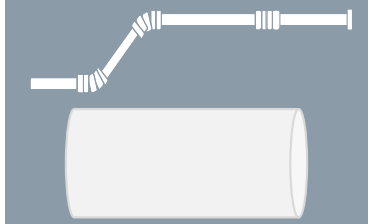
Customer service

We have introduced AI into our customer service so that it can respond appropriately to customer call.(IBM Watson)
The AI automatically inputs the conversation with the customer in real time, predicts the most appropriate answer based on the content of the conversation, and displays it to the operator.

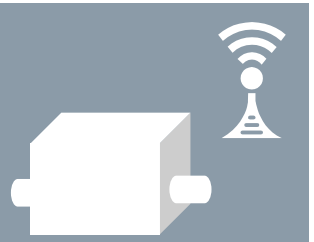
Conclusion

Water Leakage

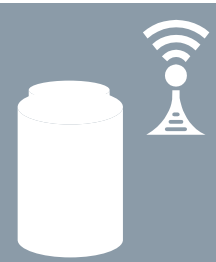
Early detection



Improve material

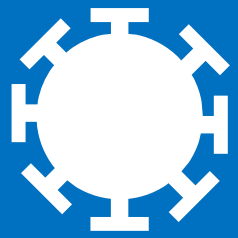


Smart meter



New detector

Combine all data

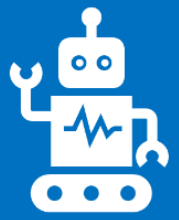


COVID-19

Remote work

Stagger commute

Promoting



ICT

Cashless

Via the Internet

Open data

AI

Thank you for listening