

Pursuing Water Loss Reduction



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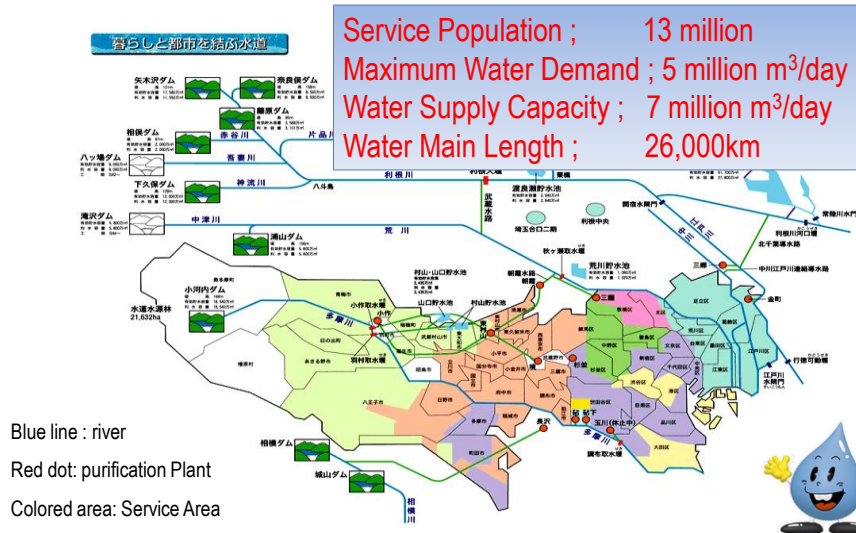
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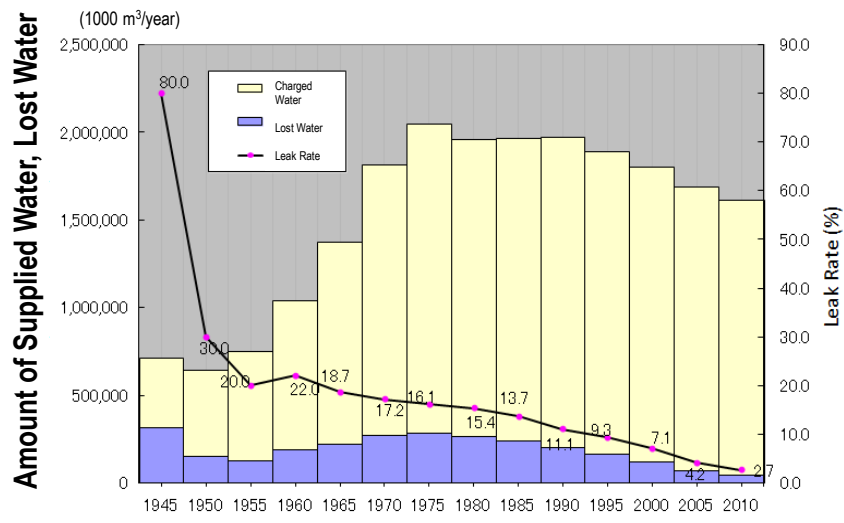
1 Outline of Tokyo Waterworks

Tokyo Waterworks has struggled against the Leak more than three decades.

Outline of Tokyo Waterworks (as of 2011)



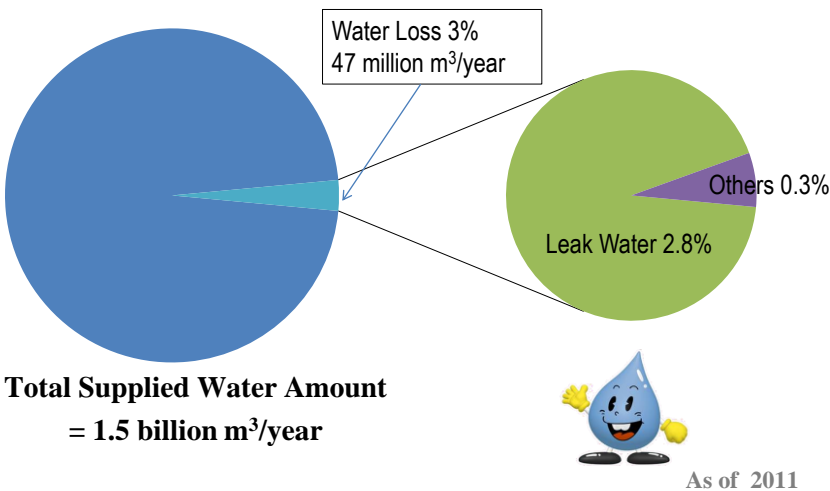
Amounts of Supplied and Lost Water, and Water Leak Rate Movements



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Outline of Water Loss in Tokyo



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2 Approach to the Water Loss Rate 3%

Preventing Leak is the most important and efficient measure to reduce the Water Loss.

Water Loss Reducing Policy (Prevent the Leak)

1 Scheduled Replacement of water mains and Employment Stainless Steel Service Pipes

- Systematic upgrading replacement the deteriorated aged water mains to high durable ductile cast iron pipes
- Replacement the old lead service pipes to the stainless steel pipes with flexible parts



Scheduled Replacement of Water Mains
(ductile pipe with anti-corrosion sleeve)

2 Detecting Leak and Swift Repair

- Scheduled leak detecting operation covers all service area
- Mobile leak detecting operation is constant alert on leak accidents in 24 hours
- Detected leak points are repaired as soon as possible



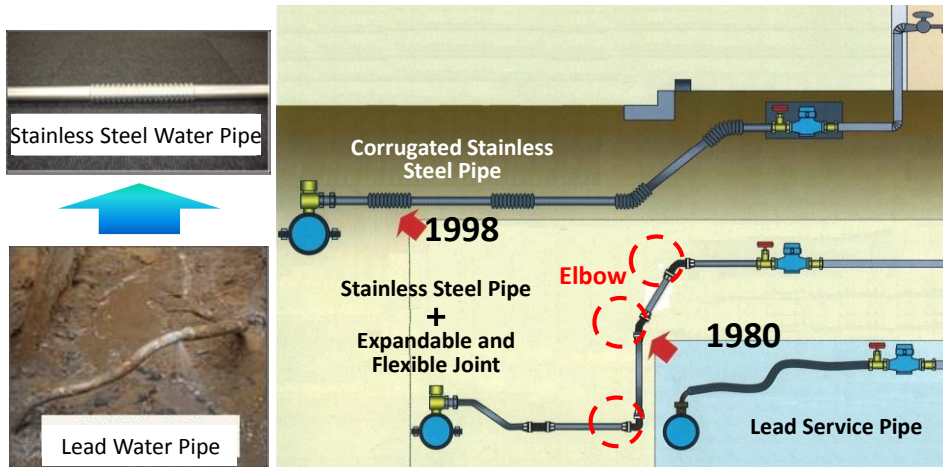
Mid-night leak detecting Operation

3 Development of Leak Detection Equipment and Conserve Legacy of Leak Detection Skill

- Development and improvement of leak detecting devices
- Bring up new experts; Tokyo Waterworks Technical Expert System conserves the legacy of Water Loss Reduction skill

1 Scheduled old service pipes Replacement to Stainless pipes

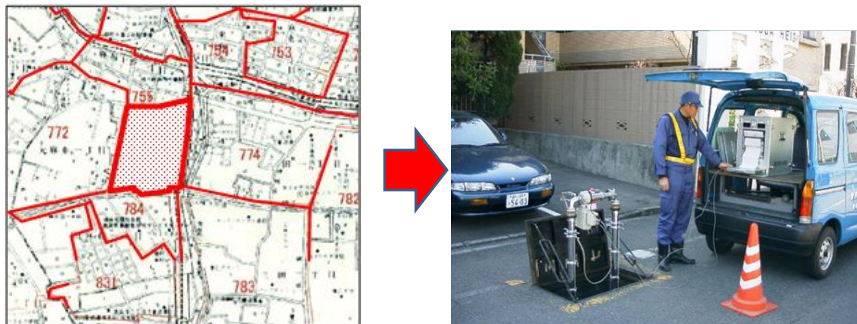
Old lead service pipes exchange to the stainless steel pipes with corrugated parts



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2 Scheduled Leak Detecting Operation



Service area is dividing into small blocks. The all blocks are investigated the leak every 10 years.
Once leak is found, it is repaired immediately.

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2 Mobile Leak Detecting Operation

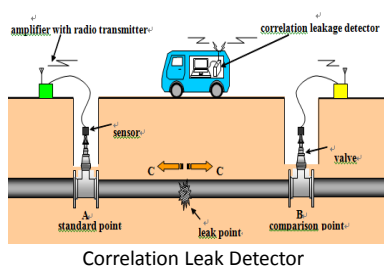


When the leak accident breaks up or informed, it is repaired immediately.
This operation is ready in practice for 24 hours every day.

3 Development of Leak Detecting Equipment

New Detecting Theory and Equipment Developing

- Correlation Leak Detection Equipment
- Temporal Integration-Leak Detector Development and Improvement



3 Conserve the Legacy of Leak Detection Skill

Tokyo Waterworks Technical Expert System

The experts' experiences and knowledge of leak detection have been passed down to younger generation with this system.

Leak Prevention Technical Instruction



Hands-on Training with a Mock Leak



Finding leaks training with acoustic methods by hearing leak noises

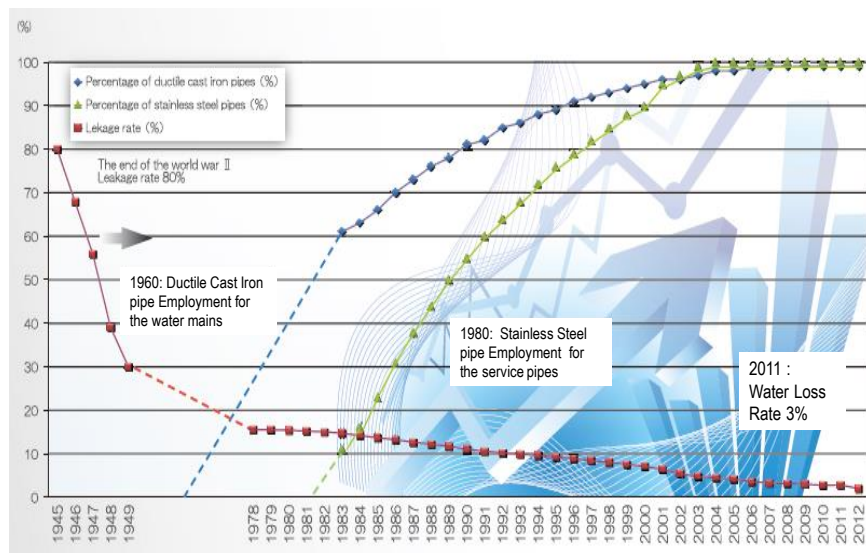
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3 Achievement

Analysis the Fruit of
30 years
Water Loss Reduction Effort

Reduction Trend of Water Loss (Leak Rate)

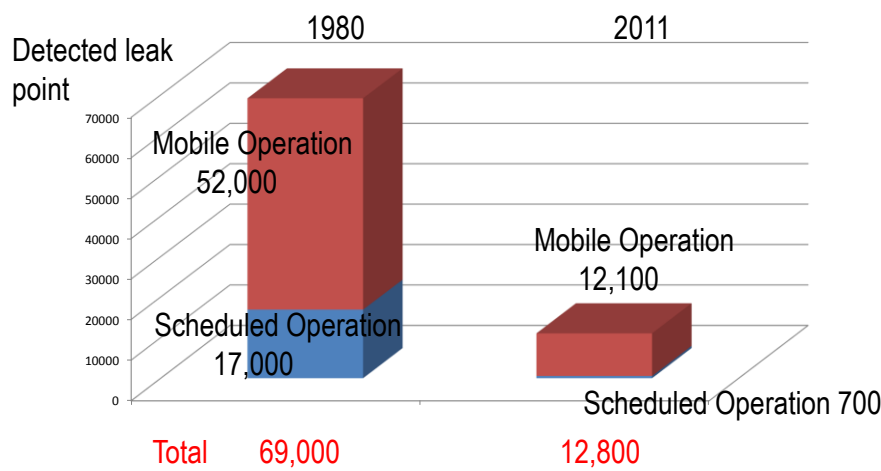


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The Leak Points Amount Change

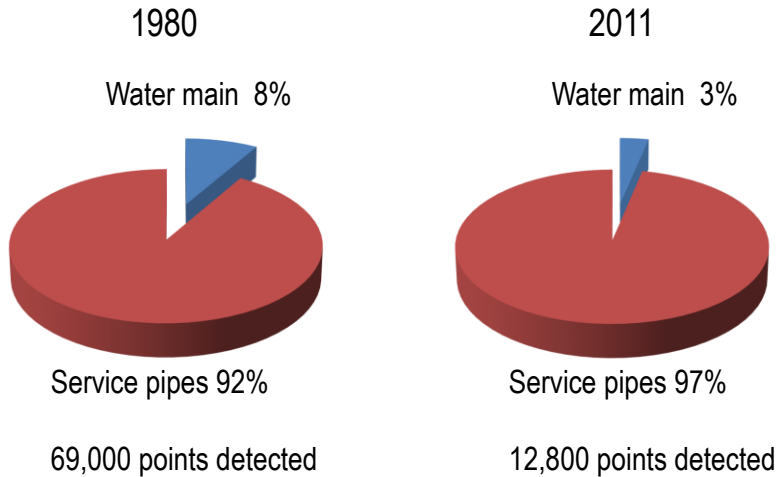
Detected leak points decrease to 19%



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Comparison of Detected Leak points with Water Mains and Service Pipes

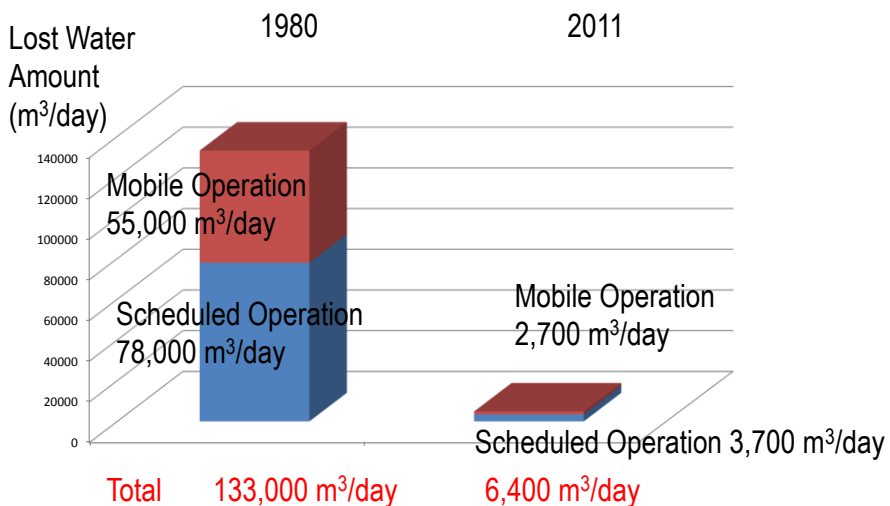


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The Prevented Lost Water Amount Change

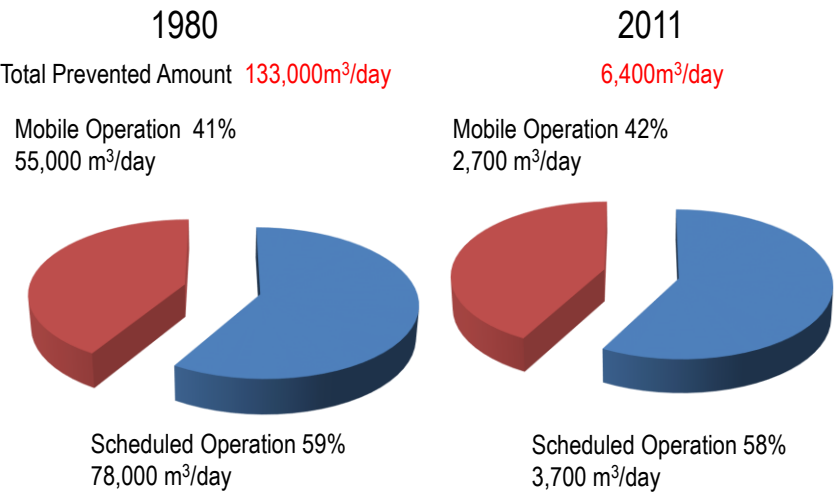
Estimated Lost Water amount decrease to 5%



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Comparison of the Prevented Lost Water Amount with Scheduled and Mobile Operation



The Effect of Leak Prevention

Period	Water Leak Rate	Reduction Volume of Supplied Water (m³/year)	Reduction of CO ₂ (t/year)	Conversion CO ₂ into number of cars
1980 ↓ 2011	15% ↓ 3 %	240,800,000	53,700	22,900

The reduction volume of supplied water is the difference between the real supplied water amount in 2011 and the estimated amount under the condition the water leak rate is 15% in 2011.

SUMMARY

The Fruit of Water Loss Reduction Effort

- Leak Detecting and Repairing Operation

Detected leak points 69,000→12,800/year

Lost water amount 133,000→ 6,400m³/day

- Water Loss rate 15% → 3%

- Tokyo Waterworks saves

Water providing : 240 million m³/year

Carbon output : 54,000t/year

Cost cut : 480 million \$/year



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Thank you for listening !

