

Administrative Report of Taipei City Government's Taipei Water Department

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Important administrative achievements

One. Innovative measures

I. Smart water meter development and water network integration

The Department carried out the "Smart Water Meter Technology Trial" and "Establishing the Taipei Smart Water Network Demonstration Area" to develop automatic meter reading and achieve integration of metering management and smart management network, which won the 2021 "8th Smart City Innovation Application Award," which was awarded by the President on March 23. The "Smart Water Meter Technology Trial" is the first of its kind in Taiwan and has successfully connected 10 groups of 18 upstream and downstream industrial chains to promote the transformation and upgrade of the domestic water meter industry, and also address the problem of insufficient labor and willingness to read meters that may be faced in the future; "Establishing the Taipei Smart Water Network Demonstration Area" develops water meter smart function applications, streaming management, smart water leakage prediction and water management model applications to enhance the efficiency of water resource management technology and usage, which will help the City to promote the effectiveness of a smart city.



Innovative Application Award

The City received the 2021 Smart City Innovation Application Award
(The only winner of the Government Smart Governance)

Strategy for promoting smart water meters in Taipei water supply districts

- Successfully attracting domestic and foreign technology integration
- Promoting industry commitment to smartwatch development
- Developing big data applications for smart water meters
- Moving towards the smart city vision for Taipei




Promoting the development of smart water meters



Big data applications



2021 Smart City Summit & Expo
智慧城市展開幕暨頒獎典禮

President Tsai presented the award.

Smart water meter development and water network integration

Important administrative achievements

II. Patented direct head for emergency repair without water outage

In order to improve the pipeline materials used in tap water supply, our team developed the patented direct head for emergency repair, which is "free of water outage", "with anti-dislodging and quake resistance", and "suitable for various materials of pipes", so as to avoid water outage during emergency repair of water supply pipes, reduce the number of water outages during emergency repair, avoid water pollution, improve construction safety, and reduce the number of complaints from customers about the lack of water. Its materials are quake-resistant and cost-effective, and can also avoid digging the road again to repair water leakage in the future. It is expected to improve the quality of the City's water supply service. In January 2021, the project obtained the "Patent Certificate" from the Intellectual Property Office, Ministry of Economic Affairs.

The Department won the Innovation Award in the City's 2021 Creative Proposal Competition

Simple and easy for water leakage emergency repair leakage - innovative design - patented direct head for an emergency report without water outage

Champion

- Avoiding water outages to reduce customer complaints, improve service, and reduce customer service burden
- Avoiding water outages for construction, avoiding customer inconvenience and improving construction safety
- Avoiding digging the road again for repairing water leakage in the future
- Based in Taiwan to sell back to Japan, the origin of stainless steel pipes
- The patent belongs to the Taipei Water Department and can be licensed free of charge for production and application.



Assembly diagram



Breakdown diagram

Patented design



Field applications



中華民國專利證書
專利號碼: M300212 號
專利名稱: 免停水排水洩壓孔
專利人: 臺北自來水事業處
發明人: 洪淑敏
申請日期: 2021年1月11日
公告日期: 2021年9月22日

Patented direct head for emergency repair without water outage

Drainage pressure relief hole without water outage ✓

Stainless steel material design ✓

Anti-dislodging and quake-resistant ring ✓

Important administrative achievements

III. Promoting "Retail water e-ticket" to save effort and environment

Our customer service center provides 24-hour retail water service to meet temporary water demand. To simplify the water purchase process and reduce contact risks, we developed the retail water e-ticket system in 2021 and introduced the e-ticket mechanism in May. Customers can pre-order a fixed amount of e-tickets by remittance during business hours, and then come to the site to collect water and verify by batches at any time, which not only saves the waiting time in the queue for each purchase, but also allows query and control of purchase and usage at any time. Especially during the bad water supply period from May to June, the business volume increases greatly, and it takes only 30 seconds to scan the QR code and upload the data for verification after collecting water, which accelerates the digestion of the queue. From May to December 2021, users purchased e-tickets 350 times and used them 4,265 times.



IV. The Zhongxiao Bridge ϕ 1500mm trunk main shield tunneling construction

In order to reduce the risk in water supply and improve the stability of water supply in the Sanchong District, the Zhongxiao Bridge ϕ 1500mm trunk main shield tunneling construction was carried out. The design of the development working shaft was to use a press-in caisson construction, and the caisson was pulled in at four anchors and then excavated and lifted to transport the earth to improve the efficiency and accuracy of caisson construction, and to ensure the safety of the adjacent Zhongxiao Bridge piers and the Airport MRT tunnel structure. The shield tunnel is pierced with an internally locked U-shaped ductile cast iron pipe, which is backfilled with concrete between the pipe and the ring piece to ensure line stability and avoid water leakage from the joints, helping extend the service life of the pipe. The project was originally scheduled to be completed in April 2022, but was completed in August 2021 ahead of schedule. The construction will be able to support the two existing attached pipelines on the Zhongxiao Bridge and vice versa, forming a dual system that not only ensures stable water supply, but can also be deployed for water outage inspection and annual maintenance to achieve the goal of asset life extension. The project was awarded the 21st Public Construction "Golden Quality Award" .

Important administrative achievements



The Zhongxiao Bridge § 1500mm trunk main shield tunneling construction was awarded the 21st Public Construction "Gold Quality Award".

Two. Important achievements

I. Strict control of water quality for premium Taipei water

(1) Strict control of water purification

We have implemented a comprehensive performance assessment of the water purification plant and adopted a "multiple barrier" strategy with reference to the practices of advanced countries, setting more stringent internal control standards than the national drinking water quality standards and using continuous detection equipment to monitor the water quality of the water purification plant around the clock so that the water discharged from the plant at all times meets the drinking water quality standards. From January to December 2021, the average turbidity of water discharged from each water purification plant was 0.012 NTU, which was much better than the regulatory limit of 2 NTU.

In order to improve the efficiency of water purification, the following measures were taken in 2021 in response to high turbidity caused by typhoons or heavy rainfall:

1. The "Zhitan Plant pretreatment equipment replacement project" started in July 2020 and was completed on August 3, 2021, which met the target and improved water purification stability.
2. The tender for the "Water purification plant sludge treatment equipment improvement project" was awarded on May 25, 2021 and is expected to be completed in November 2022. 29% of the scheduled progress of the project was achieved by the end of December 2021, which is in line with expectations. After completion, the project will enhance water purification and sludge treatment capacity and equipment operation efficiency, and increase the capability of response to high typhoon turbulence.
3. In order to prevent high manganese content in the effluent caused by the overturning of the Feitsui Reservoir due to low temperature, a "SOP for high manganese content in raw water" has been developed and a continuous manganese content detector has been installed.

(2) Full process water quality management and monitoring

Important administrative achievements

1. In addition to continuous 24-hour online water quality monitoring, and strict sampling and inspection are carried out for 139 water quality parameters. The online water quality monitoring system and the water quality testing laboratory are certified by ISO27001 and the Environmental Analysis Laboratory, Environmental Protection Administration. The water quality inspection data is real-time and transparent. Through our website, the public can access real-time information on water quality near their homes to give them peace of mind and confidence in the use of water.
2. In order to ensure the safety and purity of water sources and water quality in the Greater Taipei Area, the Department has stepped up water quality sampling and inspection. From January to December 2021, the water quality inspection included 633 samples of raw water from water purification plants, 290 samples of clean water, and 6,155 planned samples from water supply areas. In January 2021, the water quality conformity rate was slightly lower than 99.76% due to the high manganese content in the reservoir effluent as a result of the overturning of the water body caused by continuous low temperature.

(3) Promoting direct drinking water in public places

Water fountains were installed in public places such as outdoor parks to provide friendly and convenient drinking water services. 373 water fountains had been installed as of the end of December 2021. In 2021, the "Specifications for the installation of outdoor water fountains of the Taipei Water Department" were established to incorporate the needs of the physically disabled and was approved by the second quarter Civic Engagement Committee on June 22, 2021. The Department will make improvements year by year to comply with the Specifications. In addition, in order to carry through the installation of water fountains in accordance with the Specifications, a directive was issued on July 20, 2021 to all government agencies of the City to follow the latest specification when installing or replacing end-of-life outdoor water fountains, in order to make it more convenient for people with limited mobility to use them, to enhance the City's friendly drinking environment, and to create a better barrier-free space.

II. Improving the water supply pipeline network and refining facilities

(1) Water leakage management and pipeline replacement

1. With reference to the leakage management measures recommended by the International Water Association (IWA) on water loss in the water supply pipeline network, the Department has taken the four main directions of pipeline replacement, water pressure management, health checkup and leakage control, and quality of leakage repair speed to improve the water supply pipeline system with a multifaceted approach. The plan is to reduce the leakage rate from 26.99% in 2005 to 10% in 2025; in 2021, the leakage rate was expected to be reduced to 11.40% and had been reduced to 11.38%, according to statistics, which is in line with the target; the leakage rate is scheduled to be reduced to 10.88% in 2022, which will be continuously reviewed and revised on a rolling basis.
2. The Department has been promoting the "Water supply pipeline network improvement and management program" since 2006, and had replaced 2,286 kilometers of pipelines by the end of December 2020. 100 kilometers of pipelines were expected to be replaced in 2021 and 112 kilometers of pipelines were actually replaced from January to December 2021 according to statistics, which is in line with the target. 100 kilometers of pipelines were expected to be replaced in 2022

(2) District Metering Area (DMA)

The Department has been promoting DMA since 2002, dividing the pipeline network into many independent water supply districts according to the street contour. It continues to evaluate and analyze the weaknesses of the pipeline network to prioritize improvement. As of the end of December 2021, 833 districts had been consolidated and rezoned, 399 districts were expected to have been completed by the end of 2021, and 406 districts had been completed as of the end of December 2021, which is in line

Important administrative achievements

with the expected target; 426 districts are expected to have been completed by the end of 2022, and the designation and improvement of the districts will be continuously reviewed and revised on a rolling basis.

(3) Water leakage detection and repair

In order to further improve the efficiency of water leakage detection, the Department will combine water leakage detection with DMA and focus on possible leakage districts to improve the overall effectiveness of water leakage improvement. It was expected that 40 districts would be completed with the health checkups in 2021. From January to December of 2021, 44 districts had been completed, which is in line with the target. In 2022, 40 districts are expected to be completed.

(4) Trunk main rehabilitation

The Department has been implementing the trunk main rehabilitation project since 2020 to strengthen the function and extend the life of trunk mains and improve the seismic performance and reduce the impact of disasters. By 2024, the length of trunk main rehabilitation is planned to reach 15,000 meters; in 2021, it was expected that 9,000 meters would have been completed, and by the end of December 2021, 11,035 meters had been completed, which is in line with the target; in 2022, it is expected that 13,000 meters will be completed.

(5) Depot rehabilitation

The tender for a distribution reservoir and booster pump station in Tatung and Shíerzhang booster pump station was awarded in September and the construction started in December 2021, which is in line with the target and is expected to be completed in 2022. Upon completion, it will ensure the system's operational efficiency and enhance its seismic response capability.

III. Improve the reserve and backup system to ensure water supply for emergency response

(1) Active promotion of the Feitsui raw water pipe

The City set up an additional water intake on the downstream Peishih River of the Feitsui Reservoir, and set up a raw water pipeline to connect to the downstream of Tsukeng Weir, and share the water line at the head of Taipower's Tsukeng Power Plant to connect to the Eryuan water pipeline, which will increase the stability and safety of water supply in the Greater Taipei Area. The diameter of the raw water pipe is 4.5 meters and the length of construction is about 2.8 kilometers, and the funds for this project are 2 billion. After deducting NT\$400 million by self-supportive financing, the remaining NT\$1.6 billion would be shared between the special budget of the Forward-Looking Infrastructure Project and the Taipei City Government on a 50% basis (NT\$800 million each). The project started in July 2019 and the tunnel is expected to be completed in 2023; in 2021, the estimated length of the mainline tunnel was 1,600 meters, and the construction completion rate was 63.95%. As of the end of December 2021, 1,733 meters of the mainline tunnel had been excavated and the completion rate was 64.75%, which is in line with the target.

The raw water pipe construction is divided into two sections of tunnel, the Feitsui section and the Guishan section, and the Feitsui section of the tunnel was completed on September 29, 2021.

(2) Water purification backup

The Department has water purification plants such as Zhitan, Changxing, Gongguan, Yangming and Shuangxi, with a daily water purification capacity of 4.54 million metric tons and a water purification reserve rate of 40%. In order to maintain the reserve efficiency of water purification equipment, continuous improvement of the water purification equipment in each water purification plant is carried out.

(3) Water supply reserve

1. The Donghu ϕ 1,000mm trunk main and Zhongxiao Bridge ϕ 1,500mm trunk main were completed in January and August 2021, which is in line with the expected target and was

Important administrative achievements

awarded the Golden Safety Award and the Golden Quality Award respectively, which will help improve the stability of water supply in Donghu and Sanchong Districts.

2. The urban design review of the Sanchong No. 2 distribution reservoir and booster pump station has been completed. The detailed design was completed in December 2021. The application for the construction license has been approved, which is in line with the 2026 completion target and will ensure a stable water supply to the Sanchong District upon completion.
3. By the end of December 2021, section A (the Armed Forces Reserve section) of the backup trunk main of the Yiqing trunk main line (Zhonghe and Yonghe Chenggong Road PCCP) had been completed with a length of 103 meters, which is in line with the expected target. It is expected to be completed in 2025 and can ensure the water supply in Taipei City and improve the stability of the water supply in the jurisdictions of the Taiwan Water Corporation such as Banqiao and Xinzhuang.

(4) Emergency water supply during disasters

1. Emergency life-support water supply station

There are 46 emergency life-support water supply stations in the jurisdictions of the Department (including 12 disaster prevention parks), including water distribution reservoirs, water distribution pipes and life-support water storage tanks, which can provide 344,000 metric tons of drinking water for a daily supply of 3 liters of water per person for 2 weeks to meet the need for temporary disaster shelters to allow time for emergency repairs.

2. School water supply stations

In 2021, 124 public schools in Taipei City remained as water supply stations, and staff were sent to visit the schools before the flood season to check the water supply stations. Before any disaster, we will take the initiative to inform the schools to store the water towers to the full level, and the Emergency Response Center (EOC) will direct the public to the water supply stations to get water nearby according to the demand.

3. Disaster prevention groundwater wells

73 disaster prevention groundwater wells were set up in the City's disaster prevention parks, disaster prevention schools, or nearby neighborhood parks to provide water for life and miscellaneous purposes to the public for environmental cleaning and toilet sanitation during disaster periods. In order to maintain the normal supply of water from the groundwater wells, the wells are regularly maintained and managed every month.

IV. Convenient and quality service, smart water efficiency

(1) Customer service center is at work all year round

In order to provide quality services, our customer service center provides 24-hour service all year round, integrating the City's 1999 Citizen's Home Hotline System to provide customers with a personalized consultation and dispatch services for water bill inquiries, water leakage reports for repair, water outage and complaints, etc. A total of 344,467 calls were made and 18,365 dispatches were made from January to December 2021.

(2) Customer water outage service

If customers have no water at home, they can call our customer service hotline at 8733-5678 or our 1999 Citizen's Home Hotline. Upon confirmation, we will immediately send our staff or contractors to customers' homes to check their water supply equipment within one hour. A total of 6,319 water outage services were provided from January to December 2021.

(3) "Smart customer service system" interactive service

1. Online consultation and query service: The "Smart customer service water lass" was launched in July 2019, mainly for frequently asked questions. From January to

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December 2021, the number of users was 24,659 and the number of queries was 65,396, with a system response rate of 98.66%.

2. Online application and interactive service: In order to increase the convenience and willingness of customers to use the system, we completed the digitalization of the entire process of "self-reporting water consumption", "water bill trial calculation," and "natural person account transfer" in 2020. We added two new interactive services of "water bill reissuance" and "water consumption abnormality detection" in 2021, allowing customers to complete the application directly from the smart customer service system without calling or visiting the counter. A total of 3,573 uses were recorded from January to December 2021.

(4) Paperless counter service quality

After the "convenient and paperless counter application system" launch, 10 types of services, such as account transfer, suspension of water supply, and restoration of water supply, can be provided by electronic signature. Customers do not need to fill out paper application forms, and the system will archive the applications directly after the case is closed. From January to December 2021, 36,988 applications were handled, which reduced 184,667 paper printing for application forms and attachments, effectively reducing paper usage and time for customers to fill out documents and improving service.

(5) Convenient payment channels

In order to provide convenient services, the Department launched the City's smart payment platform (pay.tapei) for water bill payment. Also, it launched the online credit card payment service in conjunction with the platform. The QR codes of pay.tapei and Taiwan Pay are available on the water bills. People can scan the QR codes to check, pay and settle their bills instantly, and at the same time, a special offer of \$10 off the next water bill by combining the electronic bill with mobile payment was launched, which is well received by people. The usage rate is increasing year by year. From January to December of 2021, the usage rate of pay.tapei has grown to 8.14%, with an average of 64,271 payment collections per month. Currently, we provide 17 types of water bill payment channels, and the usage rate of non-counter payment is as high as 97.87%.

(6) Smart water meter value-added service

Using smart water meters and next-generation information and communication technology, we have set up an automatic meter reading management system and provided counseling on the use of the "Smart Water Manager" system, which allows customers to view water quality and water consumption at any time through our smart water network, as well as set up an alert service for abnormal water consumption, so as to detect abnormal water consumption or discover water leakages early to facilitate prompt improvement of water leakages and reduce unnecessary water bill expenditures and waste of water resources. As of the end of 2021, 23,284 smart water meters had been installed in new public housing, large water users with an average monthly consumption of 1,000 kWh, Taipei City affiliated agencies and schools with an average monthly consumption of more than 200 degrees, and new construction projects, and 2,997 cases had been effectively improved, with a reduction in water leakage by about 6.95 million metric tons.

(7) Diversified water conservation services

In order to make effective use of precious water resources, the Department provides water conservation services for different water usage attributes.

1. Taipei City affiliated agencies and schools

In 2019, the Department reviewed the effectiveness of water conservation in each agency and formulated the "2019-2022 water conservation implementation plan for Taipei City affiliated agencies and schools", focusing on "strengthening water

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management" and "improving water utilization". Statistics on water consumption in Taipei City affiliated agencies and schools from January to December 2021 compared to the same period in 2018 showed a decrease of more than 10%.

2. General household customer

To promote water conservation service to households, we provide services such as toilet leakage detection, water-saving faucet installation and water quality testing to households with high water consumption. From May to July 2021, the service to households was suspended due to the COVID-19 pandemic. 2,707 cases of water saving were carried out from January to December 2021.

V. Creating a water-friendly environment and fulfilling social responsibility

(1) Creating a water-friendly environment at Gongguan waterfronts

The water park is located in the hub of the Gongguan area, and is a part of the city government's efforts to promote the "Southern Taipei NTU. Ecomuseum". In recent years, the park has been actively promoting the revitalization of historical sites. In addition to quality tour content and enhanced recreational facilities, it also actively cooperates with private enterprises and public and private organizations to organize or sponsor campaigns to market the City's administration, thus attracting people. At the same time, it links the surrounding scenic spots and business districts to revitalize local tourism and attract visitors to the Gongguan business district. From May to July 2021, the park was closed to the public due to the COVID-19 pandemic and the related guided tours were suspended. 476,364 people visited the park from January to December 2021. Key activities and achievements during the period:

1. The Taipei Water Park is a designated historical site of "Taipei Waterway Water Source". Regular or reserved tours of the Museum of Drinking Water and Guanyin Mountain Reservoir were held to help visitors actively learn about the history and stories of the Museum. 197 regular tours of the Reservoir were held from January to December 2021, with 5,276 visitors; 109 group tours of the "Taipei Waterway Water Source" were held, with 3,317 visitors.
2. In order to improve the public's understanding of the historical site of YangMingshan waterway "YangMing Spring", and plan "good water exploration trip" under the premise of both historical site maintenance and environmental management, 239 individual free tours and travel agency group tours were held from January to December of 2021, with 8,489 visitors.

(2) Promoting environmental education on tap water

As a "facility for environmental education," the Taipei Water Park has been actively planning a variety of activities such as guided tours, environmental education on water resources, and DIY activities to extend the reach of environmental education to different audiences and groups and to give full play to the environmental education function of the Water Park. From May to July 2021, due to the COVID-19 pandemic, environmental education activities were suspended. From January to December 2021, 40 environmental education activities were held in the Water Park, with 2,618 visitors.

VI. Improving financial performance, enhancing asset activation

(1) Refining financial control

1. Implementing practical employment, assisting employees in enhancing their competencies through functional training and information management, and controlling employment costs.
2. Continuously improving the water supply network to reduce the leakage rate to reduce water distribution and save water supply costs.

(2) Strengthening the usage of assets and capital

1. Promoting multi-targeted use of real estate, revitalizing idle assets, increasing income

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from auxiliary businesses, and reviewing expiring leases in advance to ensure a smooth contractual transition.

2. Improving operating capital management, evaluating annual cash inflow and timing of expenditures, flexibly managing funds, and effectively reducing borrowing periods.

Three. Future administrative priorities

I. Refining the water supply environment

(1) Improving pipeline network facilities

Implementing the water pipeline network improvement plan, and improving the effective use of water resources through the use of measures such as zoning, water pressure equalization, and water leakage improvement and control.

(2) Reducing the risk of water shortage

The completion of the construction of the Feitsui raw water pipeline will improve the stability of the water supply system and the ability to respond to high turbidity raw water, and strengthen the reserve and backup function of the water distribution system to reduce the risk of water shortage.

(3) Improving disaster prevention capability

Renovation and improvement of old facilities have been carried out to stabilize the operational efficiency of the water supply system, and strengthen the emergency response capability. In addition, corrugated stainless steel pipes have been used for water supply pipes and ductile cast iron pipes have been used for distribution pipes to increase the overall quake resistance of the network and ensure a stable water supply.

II. Refining quality service

(1) Continuing to promote direct drinking

By optimizing direct drinking management and services, we provide general building direct drinking counseling, and continuously promote direct drinking; we set up mobile or fixed direct drinking fountains in outdoor public areas to increase a friendly direct drinking environment to address the public's drinking needs in public areas, to realize energy saving and carbon reduction, and to echo the vision of a sustainable and friendly city.

(2) Promoting smart water meter management

We will continue to promote the installation of smart water meters in new buildings and in Taipei City affiliated agencies and schools with average monthly water consumption of 100 kWh or more; existing buildings are now undergoing operational tests, and we also carry out the calibration and adjustment of smart water meter-related equipment, data transmission, and testing of results during the operational period, which was conducted by an impartial third party. The test results will be used as a reference for the subsequent commercialization management, allowing Taipei to smoothly and successfully enter into the development process of comprehensive smart water administration.

(3) Promoting water conservation

We continue to implement water conservation services to households, providing services such as toilet leakage detection, water-saving faucet installation, and water quality testing, etc. We also plan to introduce incentive measures for toilet leakage repair and water conservation promotion luck draws to reward households for their cooperation in water conservation for expanding the effectiveness of water conservation policies. In addition, we have joined hands with chiefs of villages and the management committees to promote community water conservation activities to raise public awareness of water conservation.

III. Propelling financial management

(1) Cost reduction

We continue to promote cost reduction programs and collect operating data,

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identify controllable items, set various cost reduction targets, prudently evaluate large investment projects, improve power operations, reduce electricity costs, make good use of technology, improve administrative efficiency and manpower effectiveness, and reduce employment costs.

(2) Increasing income

We diversify our business operations, actively and expeditiously revitalize and utilize assets, and increase non-operating income; continuously strengthen capital control and promote rational use of resources.

(3) Controlling financial performance indicators

Through a long-term investment plan, we establish a sound financial foundation from a medium- to long-term perspective, focus on strengthening our financial strength, and continue to manage our business to achieve annual operating performance targets.