

出國報告：出國類別-參與研討會及參訪

2015 年亞洲自來水事業人力資源網絡 會議及參訪日本東京都水道局訓練及 技術研發中心

服務機關：台灣自來水公司

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派赴國家：日本

出國期間：104 年 10 月 26 日至 104 年 10 月 30 日

報告日期：104 年 12 月 31 日

摘 要

本報告為 104 年 10 月 26 日起至 104 年 10 月 30 日止本公司參加「第八屆亞洲自來水事業人力資源網絡會議」及拜訪東京都水道局員工訓練及技術研發中心期間之參訪紀錄，內容構成包含亞洲自來水事業人力資源網絡會議介紹、會議行程安排、研討會發表內容、參訪景點，以及參訪心得及建議等項目。

第八屆亞洲自來水事業人力資源網絡會議由日本東京都水道局主持，並有韓國水資源公社、首爾市水務局、泰國都會水務局、蒙古自來水服務管理委員會、烏蘭巴托市住宅公共事業及本公司計 7 個事業機構之代表人員與會。本屆會議討論主題為各自來水事業單位之人力資源規劃發展，並由主辦單位安排參訪東京都水道局轄管之設施如東村山淨水場、小河內水庫、檜村淨水所、羽村取水堰及員工訓練及技術研發中心。

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壹、關於亞洲自來水事業人力資源網絡會議（A1-HRD）

「亞洲自來水事業人力資源網絡會議」（Asian Waterworks Utilities Network of Human Resource Development）由東京都水道局於 2007 年所發起，其成立緣起係為促進亞洲各國或城市間之自來水事業機構間之國際交流，建構人力資源知識共享及意見交換的溝通平台。會議縮寫名稱為「A WUN HRD（A1-HRD）」，充分展現各國（城市）自來水事業機構欲透過人力資源網絡的健全發展，戮力成為亞洲第一的事業企圖心。

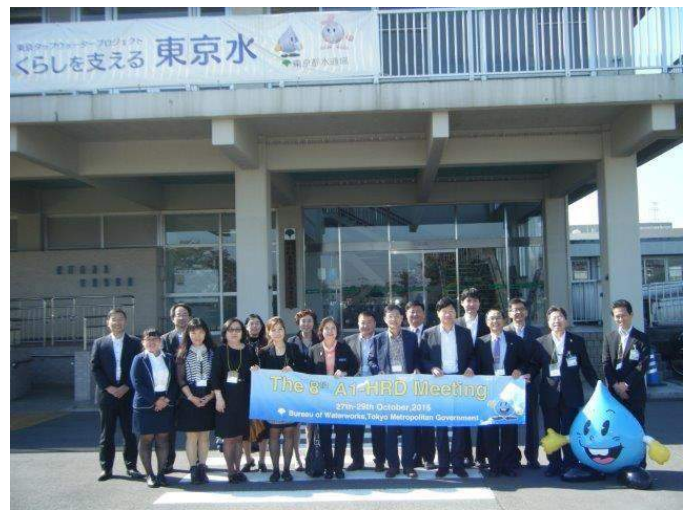
論壇成員除發起者日本東京都水道局之外，尚有韓國水資源公社（Korea Water Resources Corporation）、首爾市水務局（The Office of Waterworks, Seoul Metropolitan Government）、台灣自來水公司、臺北市自來水事業處、越南建設部第二建設協會（College of Construction No. 2, Vietnam Ministry of Construction）、泰國都會水務局（Metropolitan Waterworks Authority (MWA)）等多個亞洲自來水事業單位。

各自來水事業機構間之平日交流方式透過網站資訊分享及發送電子公報，其中一年一度舉行的人力資源網絡會議是各自來水事業機構間最重要的意見交流場域，成員於事前商定該年度的討論主題，議題內容廣泛，包含訓練員工或人力規劃發展時所面臨的各項問題或挑戰，與會者於大會報告陳述後進行相互意見交換。

自 2008 年首次舉辦以來，2015 年亞洲自來水事業人力資源網絡會議邁入第八屆，共有 5 個事業機構會員包括主辦國東京都水道局、韓國水資源公社、首爾市水務局、泰國都會水務局及本公司計 23 名人員參加。此外，蒙古自來水服務管理委員會（Water Services Regulatory Commission of Mongolia）及烏蘭巴托市住宅及公共事業局（Housing and Public Utilities Authority of Ulaanbaatar City）亦以觀察員身份出席與會。



第一天與會人員於東京都水道局立川辦公室合影



第二天於東村山淨水場舉行人力資源研討會



第三天攝於小河內水庫保水森林親林步道



第四天參觀東京都水道局員工訓練及技術研發中心

貳、第八屆人力資源網絡會議議程安排

本屆會議期程主要為 10 月 27 日起至 10 月 29 日共 3 天，10 月 30 日為自由參加行程，由東道主東京都水道局安排參訪該局位於田園調布市的員工訓練及技術研發中心，總計有 5 個國家 7 個自來水事業機構（含觀察員）參與此屆會議。

會議第一天（10 月 27 日）首先前往東京都水道局立川辦公室，由東京都水道局多摩水道改革推進本部部長石井玲致詞後，各事業單位互相致贈紀念品，隨後由主辦單位以簡報介紹東京都多摩地區的自來水事業發展過程，並在工作人員引導下，參觀立川辦公室內部的水質檢驗設備、中控室、顧客中心及服務台。晚間於立川辦公室舉行歡迎餐會，氣氛輕鬆愉悅，各國人員寒暄互動熱絡。

第二天（10 月 28 日）議程於東村山淨水場會議廳進行，各自來水事業單位就本屆會議主題「自來水事業人力資源發展」依序進行簡報發表及提問，其間空檔休息時間則穿插東村山淨水場的實地導覽解說活動以及觀察員蒙古烏蘭巴托市住宅及公共事業局介紹烏蘭巴托市自來水事業發展現況，並在意見交流時間共同討論決定了下屆會議的發表主題為「提升危機管理的人力資源發展」及「友善環境的水資源計畫與人力資源發展」二擇一。晚間則與多位東京都水道局主管及員工共進晚餐聯歡，在談笑風生間結束第二日行程。

第三天（10 月 29 日）行程安排參觀東京多摩地區的水道設施，上午前往奧多摩地區的小河內水庫，下午參觀保水森林、檜村淨水所、羽村取水堰及新成立不久的羽村展示廳。

第四天（10 月 30 日）主要參訪東京都水道局的員工訓練及技術研發中心，員工訓練及技術研發中心不僅提供人才培育養成必要的進修訓練課程外，在此也進行委託及共同研究，以及現存和最新技術的文獻調查研究。本屆會議在參訪研修中心後，與會人員離情依依的道別中，圓滿劃下句點。

表一、第八屆亞洲自來水事業人力資源網絡會議議程表

第一天 10月27日(星期二) 地點: 東京都水道局立川辦公室		
Time	Item	Remarks
12:50 PM	於立川皇宮大飯店大廳集合	東京都水道局提供交通車
1:30 - 2:15 PM	開幕式	
	主辦單位致詞、紀念品交換及團體合照	
2:15 - 2:45 PM	簡報介紹多摩地區自來水事業發展	
2:45 - 3:00 PM	休息時間	
3:00 - 5:15 PM	參觀東京都水道局立川辦公室 水質檢驗設備、整合控制室、顧客中心、服務站	
5:30 - 7:00 PM	歡迎會 (於立川辦公室)	
7:00 - 7:30 PM	返抵立川皇宮大飯店	東京都水道局提供交通車
第二天 10月28日(星期三) 地點: 東村山淨水場		
Time	Item	Remarks
8:20 AM	於立川皇宮大飯店大廳集合	東京都水道局提供交通車
9:30 AM	開場白	
9:35 - 10:05 AM	簡報 (韓國水資源公社)	
10:05 - 10:35 AM	簡報 (泰國都會水務局)	
10:35 - 10:50 AM	休息時間	
10:50 - 11:20 AM	簡報 (首爾市水務局)	
11:20 - 11:50 AM	簡報 (台灣自來水公司)	
午餐		
1:00 - 1:30 PM	簡報 (東京都水道局)	
1:30 - 2:00 PM	介紹東村山淨水場	
	致歡迎詞及簡報	
2:00 - 3:00 PM	參觀東村山淨水場	
3:00 - 3:10 PM	休息時間	
3:10 - 4:50 PM	意見交流及討論	
4:50 - 5:00 PM	觀察員國蒙古介紹烏蘭巴托市	
5:00 - 6:00 PM	返回立川皇宮大飯店	

6:00 – 6:40 PM	休息	
6:40 PM	於立川皇宮大飯店大廳集合	
7:00 – 9:00 PM	於餐廳舉行歡送會	
9:00 – 9:10 PM	返回立川皇宮大飯店	在東京都水道局工作人員 陪伴下步行回飯店。
第三天 10月29日(星期四) 參觀東京多摩地區的水道設施		
Time	Item	Remarks
8:20 AM	於立川皇宮大飯店大廳集合	東京都水道局提供交通車
8:30 – 10:30 AM	前往奧多摩地區	
10:30 – 12:00 PM	參觀小河內水庫	
午餐		
1:00 – 1:50 PM	參觀保水森林	
1:50 – 2:00 PM	前往檜村淨水所	
2:00 – 2:40 PM	參觀檜村淨水所	
2:40 – 3:30 PM	前往羽村取水堰	
3:30 – 4:20 PM	參觀羽村取水堰解說展示廳	
4:20 – 5:10 PM	返回立川皇宮大飯店	
自由參加行程 10月30日(星期五) 參觀東京都水道局員工訓練及研發中心		
Time	Item	Remarks
8:30 AM	於立川皇宮大飯店大廳集合	東京都水道局提供交通車
10:00 AM - 12:30 PM	參觀員工訓練及研發中心	
午餐		
1:30 PM -	前往羽田機場搭機返國	

資料來源：東京都水道局製表



研討會發表



歡送晚會

叁、第八屆會議研討主題

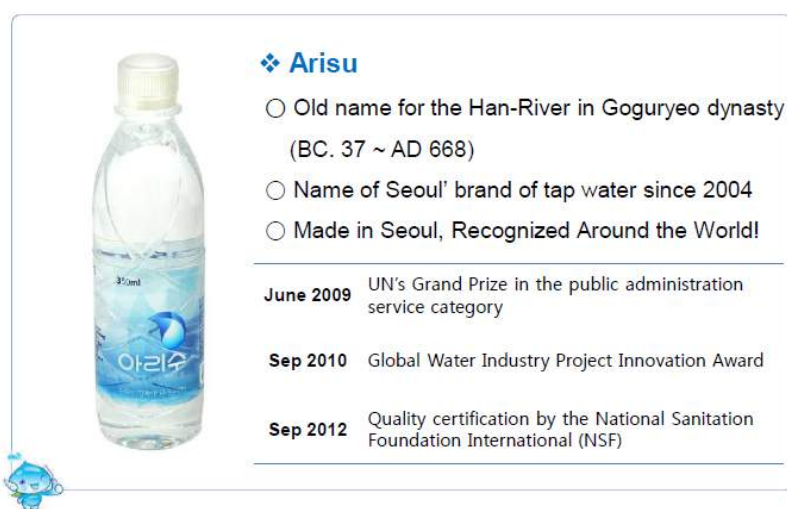
本屆會議主題為「自來水事業人力資源發展」，茲將韓國首爾市水務局及日本東京都水道局發表重點內容摘要如下：

一、 韓國首爾市水務局

(一) 基本介紹

2004 年，韓國首爾市政府正式把首爾市的自來水的命名為「Arisu」，「Arisu」曾經是漢江的舊稱，代表著韓國首爾市把自來水作為品牌經營的企圖，希望在用戶心中建立「Always, Reliable, Innovative, Smart and User-friendly」可信賴的品牌形象，鼓勵民眾多使用自來水，減少購買市販及進口的礦泉水。

截至 2013 年，首爾市自來水的顧客滿意度始終停留在 7 成左右，有鑑於此，韓國首爾市水務局近年來開始展開全面性的顧客服務計畫，此全面性的顧客服務計畫包含服務創新及以顧客為本位的客戶申訴系統，期能縮短顧客的等候時間、快速回應客戶的抱怨，以及達成單一窗口收件全程服務的目標。



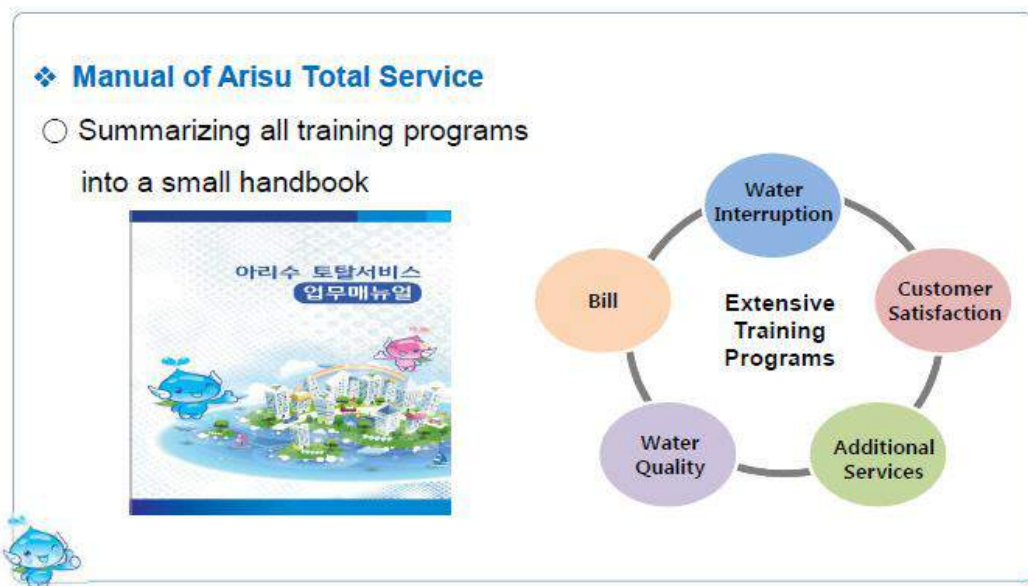
圖一、韓國首爾市水務局的品牌形象塑造

資料來源：韓國首爾市水務局簡報發表內容

(二) 韓國首爾市水務局的人力資源發展特色

為推動全面性顧客服務，韓國首爾市水務局訂定一套人力資源培訓計畫，以提高顧客對自來水的生產、供給、設施建設、收繳費及其他服務層面的滿意度。

首先於九宜淨水場一樓開設新的員工訓練中心，由 10 年至 20 年資歷的資深員工、退休員工及契約員工擔任指導人員，提供理論及實務訓練。課程範圍涵蓋漏水檢測、修復及置換水表、排除水壓異常問題、濁度檢測、帳單處理、服務禮儀等內容外，也訓練員工有能力為顧客提供進一步的服務，諸如使顧客獲知自來水使用上的資訊、如何移除自來水中的異味、檢測家中水龍頭是否有生鏽的情形等。韓國首爾市水務局統整這些訓練內容並製作成小手冊，使員工隨時隨地都能查閱。



圖二、韓國首爾市水務局將教育訓練內容彙整成員工可隨身攜帶查閱之小手冊

資料來源：韓國首爾市水務局簡報發表內容

二、東京都水道局

(一) 基本介紹

從平成 25 年度的統計數字來看，東京水道局的整年總配水量達到 15 億 2,349 萬立方公尺，一天最大配水量可達 463 萬立方公尺。除了提供東京都 23 區及多摩地區

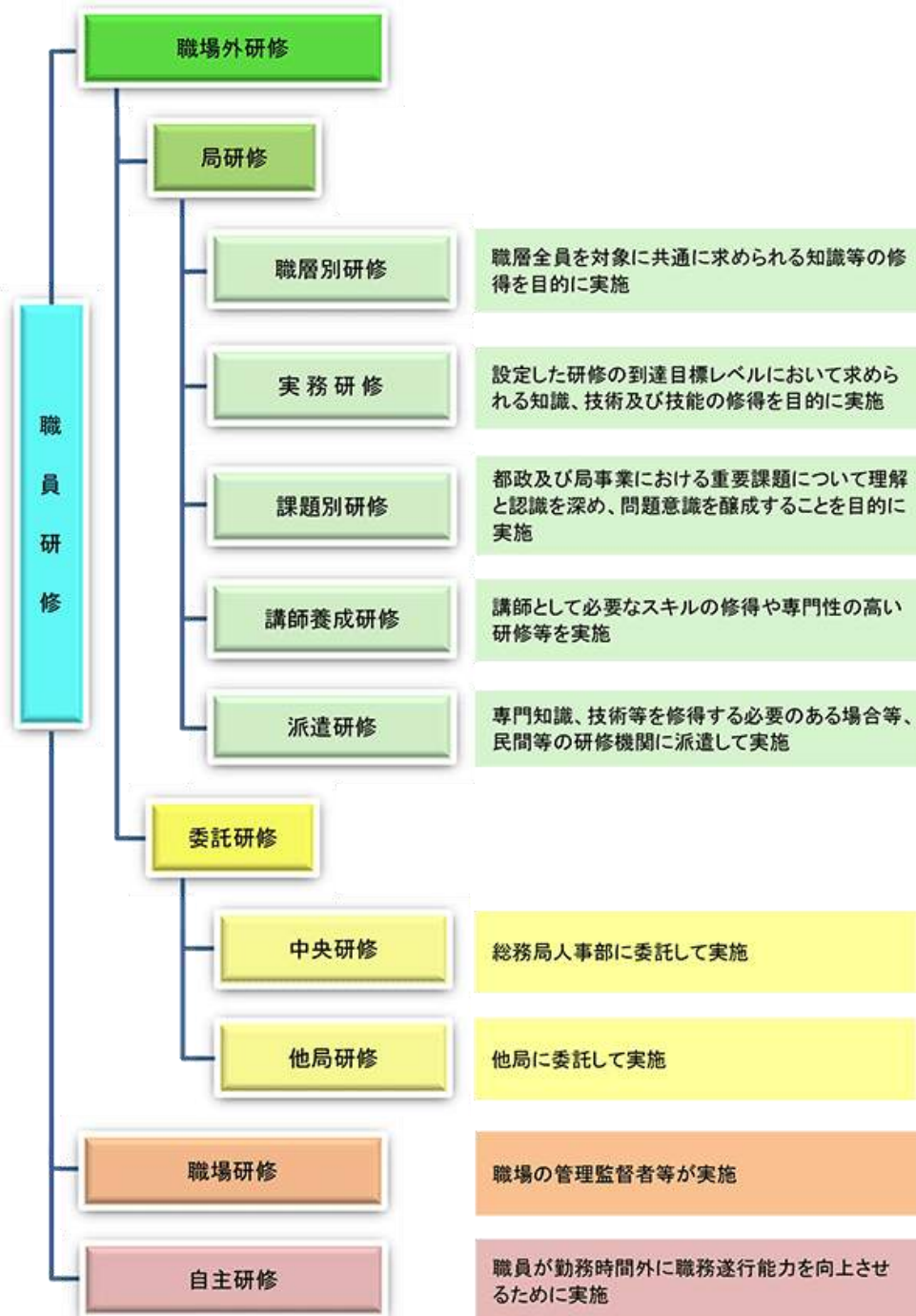
Self-Development Support

Content of support	Items	Expenses granted	Expenses borne by TMG		Conditions for support
			Ratio	Upper limit	
Support to acquire a qualification	77 qualifications	Examination fees	100% of the expenses covered	None	Pass the examination
		Mandatory training		None	
		Training to prepare for examinations		60,000 yen	
Support to have a training course	109 training courses	Course fees	50% of fees covered	None	Completion of the training course

圖四、東京都水道局員工自主參加教育訓練或證照考驗補助範圍及額度

資料來源：東京都水道局簡報發表內容

東京都水道局自辦研修的課程內容尚可細分為五類，分別是職級別課程、實務課程、主題課程、講師養成課程以及派遣課程。職級別課程是以隸屬於某一層級的員工為對象，使該層級的員工能夠習得共通的知識；實務課程是事先設定訓練目標，以實務技術及技能的習得為目的；主題課程是為了讓職員更深入了解東京都現今的政策計畫及重要課題而開設的一系列課程，授課目標是培養職員們的問題意識；講師養成課程的內容專門性較高，目的是培育職員成為某領域講師的專業能力；派遣課程指的則是在必要的時候，派遣水道局的職員於民間企業機構學習專門知識及技術。



圖五、東京都水道局職員教育訓練方式示意圖

資料來源：東京都水道局官方網站（<https://www.waterworks.metro.tokyo.jp/>）

肆、參訪行程

一、東京都水道局立川辦公室（Tachikawa Office）

東京都水道局在立川市設立多摩水道改革促進本部，作為多摩地區自來水設施的管理據點及設置供水管理辦公室，同時也設置服務站，專門處理自來水水費的收繳及新裝工程的審查作業，使多摩地區的自來水營運能夠更有效率。另外，尚設有顧客服務中心，受理客戶撥打進來的詢問電話。

為了和各市町間的考工等日常作業能順利推動，東京都水道局和多摩地區的 26 個市町會定期進行資訊及意見交流，並於平成 24 年 2 月建立「多摩自來水聯絡會」，為多摩地區的自來水事業共謀發展。



多摩水道改革促進本部部長石井玲致歡迎詞



東京都水道局簡報介紹供水區域系統



立川辦公室客戶服務中心服務理念標語



立川辦公室設有水質檢驗室對水質異常問題進行檢測（圖為水龍頭因鏽蝕而殘留的鐵屑）

二、東村山淨水場（Higashi-murayama Purification Plant）

東京都水道局下設置的大型淨水場主要有金町淨水場、三鄉淨水場、朝霞淨水場、三園淨水場以及東村山淨水場，其中東村山淨水場和朝霞淨水場間設有原水聯絡管線，因此可同時取利根川、荒川及多摩川的原水使用。

由於地形上的高低差，東村山淨水場的多摩川原水係以自然流的方式取水，地理條件使東村山淨水場具備水力發電設施，並自平成 13 年度啟用，供應淨水場運轉所需的一部份電力。

東村山淨水場的送水也多半是利用自然流出的方式，平成 22 年 3 月引進了高質淨水處理（每日 88 萬立方公尺）後，從利根川及荒川所取來的全部原水皆可以在此處理完成。此外，為了讓地震發生時，淨水設備仍能正常運作，東村山淨水場備有自用發電設備。



俯瞰東村山淨水場



沉澱池

三、奧多摩地區小河內水庫（Ogouchi Dam）

小河內水庫在東京都奧多摩町，標高 530 公尺之處。其主要水源來自多摩川上游，集水區域橫跨東京都奧多摩町、山梨縣的丹波山村、小菅村以及甲州市等 4 個市村鎮，面積約為 263 平方公里。

建造於水庫下方的多摩川第一發電廠將水庫貯存的水量用作發電後，放流至多摩川，下游的小作攔河堰及羽村攔河堰即能取得原水。順流而下的原水一路經過村山・山口蓄水池、玉川上水水道，來到東村山等地的淨水場。東村山淨水場透過連絡管線送水，也能將原水送至朝霞、三園等各淨水場。

小河內水庫於昭和 32 年完工，當時東京地區的用水主要多依賴多摩川水系，現在東京都的水源僅有 20%來自於多摩川水系。然而，小河內水庫為東京都獨有的水源，在利根川水系面臨缺水時或遇突發事故而須增加放水量時，依然扮演者穩定供水的重要角色。

此外，小河內水庫竣工雖已屆 50 年，經過耐震度調查測試，即便在遭逢最大震度的強震時也能確保安全無虞。



奧多摩地區小河內水庫



小河內水庫內部結構介紹



將水庫多餘的貯水放回多摩川



小河內水庫上游之水源森林

四、水土保持森林（Water Conservation Forest）

東京都水道局為了確保多摩川水源區域的河川流量穩定及小河內蓄水池（奧多摩湖）的儲水功能得以有效發揮，對多摩川上流的森林加以進行管理，並將這片森林稱作「保水森林」。

保水森林的範圍面積自東京都最西部的奧多摩町起算，至山梨縣轄下的小菅村、丹波山村、甲州市，東西長達 30.9 公里，南北長約 19.5 公里，面積約 23,000 公頃，相當於東京都面積的 10%。

這片位於多摩川上游流域的森林在過去多屬民有地，人工種植了杉樹及檜木，由於林業的蕭條不振，缺乏管理維護而荒廢。因此，東京水道局為了使這片森林能再度發揮水土保持的功能，於平成 14 年 7 月發起了「多摩川水源森林隊」，藉由募集志工，對森林重新進行全面的植栽、除草等保育工作。



水源森林親林步道



水源森林分布圖

五、檜村淨水所（Himura Purification Plant）

新檜村淨水所是整合了過去兩個老舊的淨水所（冰川淨水所和舊檜村淨水所）興建而成，淨水所裡的設施可分為配水池及膜過濾設備兩部分，並備有送（配）水

幫浦、緊急發電機、小水力發電設備和緊急送水設備，對深井汲取上來的地下水進行膜過濾處理，原水經過超微細孔徑後可分離除去雜質，並留下對人體有益的礦物質。目前在多摩地區有 9 個規模較小的淨水所使用膜過濾淨水設備。



原水流入管



小水力發電機

六、羽村取水堰（Hamura Intake Weir）

羽村取水堰坐落於東京都羽村市，是多摩川的取水堰，目前由東京都水道局管理，透過羽村取水堰，多摩川的水可以送往東村山淨水場及小作淨水場等地。

其由固定堰及投渡堰等 2 種不同型態的堰共同架構而成。所謂的投渡堰即是在堰的支柱的橫樑上利用樹木的枝幹做成柵欄，豪雨時多摩川的流量大幅增加時，可將堰上的樹木枝幹取下，投入多摩川中，以改變河川的流向或阻擋洪水。投渡堰的做法自 1654 年江戶時代開始，至今仍維持當初的模式。

投渡堰被認為是支持過去江戶時代快速發展的重要設施，具有高度的歷史價值，且設置當時的技術妥善傳承至今，平成 26 年獲土木學會認定為近代土木遺產。



俯瞰羽村取水堰



投渡堰所使用的原木柵欄實物展示

七、員工訓練及技術研發中心

東京都的自來水事業，以水源設施為首，尚包括淨水場、送水所，以及長達約 26,000 公里的配水管網，對於原水水質變化時淨水處理方法的調整，及地震災害發生時大規模漏水等緊急事故的現場應變處理機制相當重視，為了使實務技能及技術開發能相輔相成，東京都水道局設立了員工訓練及技術研發中心，並在此中心裡設置教育訓練部門及研究開發部門。

位於世田谷區的員工訓練及技術研發中心擁有日本國內規模最大的自來水事業專業進修及研發設施。建築物涵蓋地下一層樓和地上三層樓，主要分為兩部分，一為員工受訓進修的研修區，及進行自來水專業技術開發的研發區。

員工訓練及技術研發中心前身為玉川淨水場，玉川淨水場在昭和 40 年代因原水水質惡化即已停止運作，利用當時舊建築所改建的研修中心仍保有當時玉川淨水場

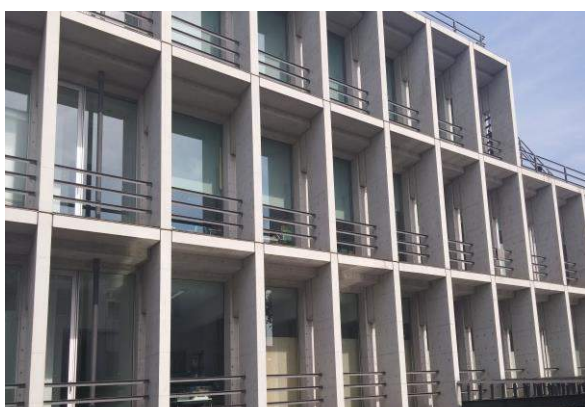
的磚造牆壁，並考量研修中心的目的和機能加以重新設計，該棟建築物於平成 24 年 10 月獲得了國土交通大臣表彰，得到了「公共建築大賞」的榮譽。



員工訓練與技術研發中心上課教室



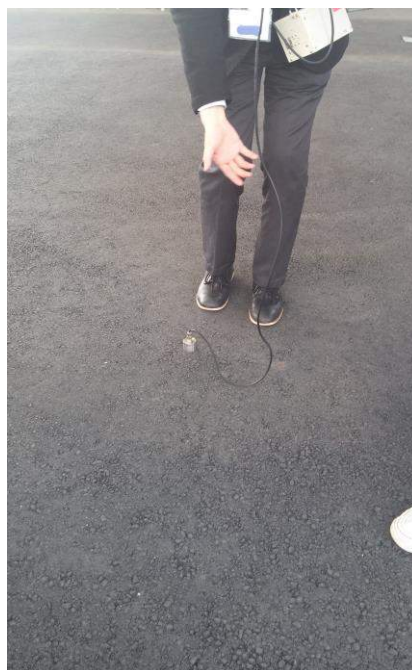
電氣設備模擬教室



員工訓練中心建築外觀



戶外實境模擬練習區（管線連接安裝）



訓練操作者能運用儀器分辨破管漏水處

伍、建議及參訪心得

不同的國家及地區存在著多種水資源方面的問題，21 世紀的現在，世界上至今尚有 7 億的人口無法獲取安全的飲用水，特別是在人口增加快速的發展中國家，仍必須面對欠缺完備的自來水設施建設，或是因漏水問題而無法降低無收益水等種種課題。亞洲自來水事業人力資源網絡會議的設立便是希望各國能透過一個意見交流平台，以集思廣益、腦力激盪的方式來思考上述的困境，並逐步地尋找問題解決的方法。

過去幾屆的會議議題以技術層面議題居多，本屆議題再度回歸到人力資源發展基本課題的討論。各國自來水事業單位由於事業策略及組織發展階段上的異質性，所面臨的問題不盡相同，於各自的人力資源規劃發展上自然也展現了獨自的特色。此外，在國際交流、氣候變遷和環境倫理、公眾形象營造等方面等則表現出共同的關心和持續不斷的努力，也是本公司未來可以琢磨學習的部分，以下就上述幾項議題提出心得與建議：

一、國際交流的開展

在國際化及全球化趨勢下，各自來水事業單位有其不同的因應方式，例如：韓國水資源公社在亞洲開發銀行支援下設立亞洲水資源教育網絡基金會（Asian Water Education Network Foundation），提供跨國線上學習課程及教育資訊服務；泰國都會水務局特別重視員工外語能力的提升，於下班時間為員工開設英語會話班。

其中特別令人印象深刻的是東京水道局接受海外人員提出研修申請的教育訓練交流制度。東京都水道局長年來積極回應世界各國的請求，持續接受海外自來水事業人員赴日研修，也將其職員派遣至海外進行技術交流，並透過國際會議及網頁向國際發聲，展現其優秀的自來水技術。近年來，也和東京都水道局的監理團體東京水道服務株式會社（TSS）以及其子公司東京水道國際株式會社（TWI）共同進行海外交流事業的開展。

二、研發技術的投入

研發技術方面，日本及韓國兩國皆展示了科學技術應用的成果。例如：為倡導乾淨能源的利用，韓國水資源公社善用其地理環境優勢及技術能力，建造了全世界最大的潮汐發電設備，並足以供給多個城市及工業區用電；日本則是設立技術研發部門專責自來水專業技術的傳承，利用自行研究或委外研究的方式，進行相關知識技術等資料蒐集，並以文件及影像的方式加以保存管理，如此一來，透過公司內部網路，職員就可以取得業務上必要的專門技術情報。技術及硬體設備的研發部分，東京水道局在漏水感應裝置、水表、給（配）水管的耐蝕性及淨水處理技術等多方面皆有卓越的研究成果，管線自動檢測機的開發便是一例。以往在主要的大口徑配水管及送水管破損時，為了進行進一步的調查，必須採行大範圍的停水措施，實施起來亦相當困難。為此，東京水道局開發了管線自動檢測機，對於口徑 800mm 以上的漏水管線不需要實施斷水，並且透過自動檢測機搭載之照相及 LED 照明設備便可以進行全方位的管線調查。



技術研發中心



研發成果的展示

三、形象營造及行銷推廣上的努力

在此次參訪景點中，新設立不久的羽村取水堰展示廳別具有社會教育及公眾教育之功能。為了讓來訪參觀的民眾及學童都能理解水資源相關知識並進而珍惜水資源，展示廳的牌示解說內容用字淺顯易懂，並設置東京水文環境模型，透過投影技

術及影片的播放，參觀人員得以了解多摩川的水源自保水森林流向東京灣的過程，以及保水森林的功能及生物多樣性。廳內另有大型投影螢幕區，以動畫方式讓參訪人員體感羽村取水堰投渡堰的功能及模擬實際操作情形，令人猶如身歷其境。



羽村取水堰展示廳播放介紹森林整治大隊的影片



東京水文介紹及地理環境模擬

四、對環境變遷問題的重視

近來全球暖化與氣候變遷對於水資源的穩定供應影響至鉅，各自來水事業單位皆提及環境倫理的議題，並期許能善盡地球公民的責任。例如：韓國水資源公社近年來仍持續進行潮汐、風力、太陽能等乾淨能源的開發利用。

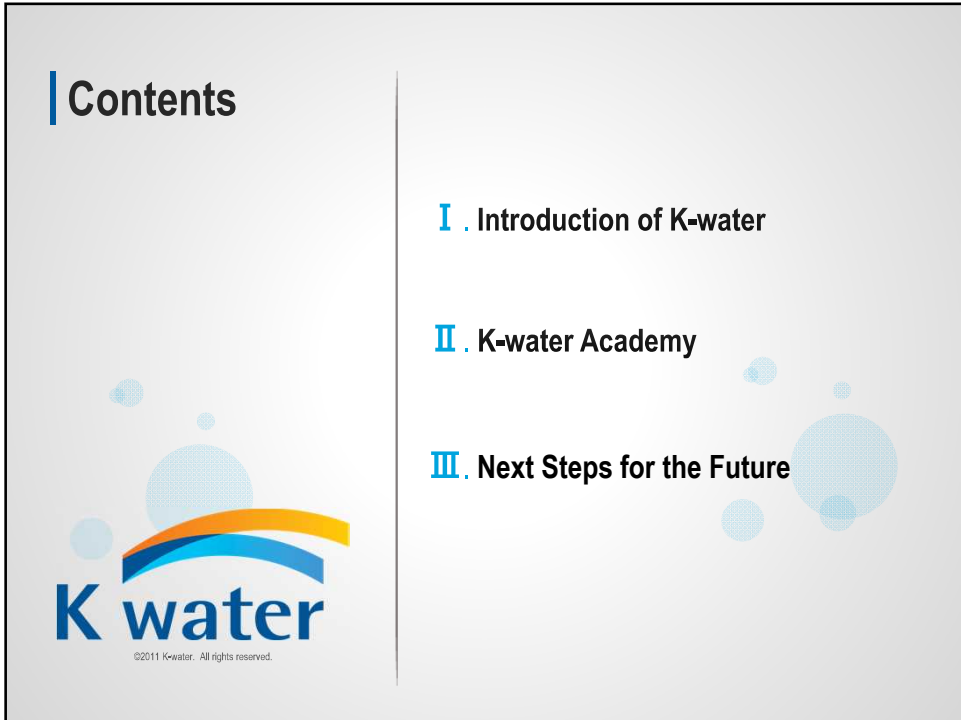
東京都水道局則注意到森林資源的養護有助於水資源的貯存，提倡森林保育觀念並招募民間志工組成森林復育大隊，對於荒林重新加以整頓管理，奧多摩地區小河內水庫上游的保水森林即為其努力投入之成果，同時也開放親林步道供民眾健行，別具寓教於樂之意義。此外，在淨水場的過濾池及配水池上方鋪設太陽能發電設備，或是利用河川水流流入給水廠站時的自然水壓配置小水力發電設備，這些自然再生能源的利用皆能減緩溫室效應蔓延的速度。

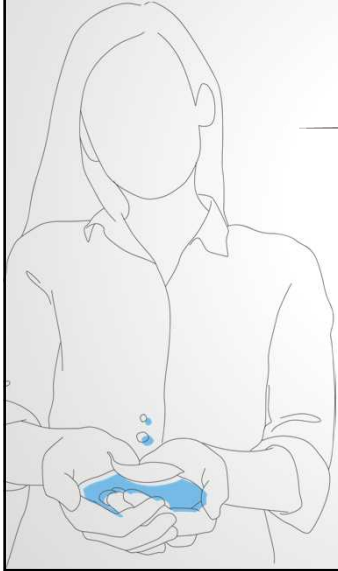


羽村取水堰展示廳屋頂之綠化具有隔熱降溫之效果

五、結語

目前本公司參與國際交流的機會日益增加，應在公司內營造學習外語的氛圍及建立獎勵制度以創造員工學習的動力及契機。此外，本公司限於經費預算及成本費用，硬體資源設備或許尚未能與日韓等先進國家齊頭並進，然而在軟體資源人員能力訓練制度的建置、問題研究意識的培養及民間資源的利用部份仍是本公司可以效尤之處。





I Introduction of K-water

K-water: Water for the Happier World
K-water promises to become a leading provider of water and related services that makes the world happier with its water.

Total Water Service Provider K-water

1. About K-water



A major public-service corporation in Korea
with a history of 48 years of water management



Total Water Service Provider



- Water Resources
- Water Supply and Sewerage
- Clean Energy
- River Restoration and Canals
- Providing Industrial Water and Seawater Desalination

2. Status as of 2015



Hot Issue

The 7th World Water Forum 2015

- Smart Water Management Initiative (SWMI)
- Global Cooperation on Climate Change



General Status of K-water

- Asset: 25 billion USD (Sales 3.6 billion)
- Structure (4 Divisions, 26 Dept, 60 Offices)
- Employees: 4,380 staffs

3. K-water Business



01 Water Resource

- 16 Multipurpose Dams & 8 Under Const.
- 14 Water Supply Dams
- Amt. of Water **16,281 Millions m³**
- Amt. of Energy Generated **1,047,000 kW**



02 Water Supply

- 35 Multi-Regional, 22 Local Water Supply
- Operating Ultra Pure Water, Desalination
- Cap. of Water Supply: **19 Million m³/day**
- UPW: **0.3 M**, Desalination: **1,815 M m³/day**



03 Clean Energy Waterfront City

- Operating the world's largest Tidal Power
- Tidal, Wind, Solar Power: **255 MW (Total)**
- Servicing **9 cities & Industrial Clusters**
- Developing 8 new cities & Ind. Clusters



04 Overseas Business

- 43 Projects Completed Successfully
- 16 Projects Under Development
- Various Global Cooperation Activities



More Information [http:// English.kwater.or.kr](http://English.kwater.or.kr)



- About K-water
- Business
- Investor Relations
- Technology
- Sustainability
- Press center

KOREAN | MENU | Q



Smart Water Management Initiative

K-water is dedicated to improving the value of water.

- Water Resources Facilities
- Multi-regional Water Supply System
- Local Water Supply & Sewerage System
- Industrial Water
- Sewage
- Waterfront Development
- Clean Energy Projects
- Overseas Project

II K-water Academy

Learn, Act and Achieve!



Total Water Service Provider K-water

1. Overview of K-water Academy



Work Organization

Water Education for Leadership

- HRD Planning
- Leadership Training
- Job Training (Business)

Water Education for Professional

- Job Training (Engineering)
- Gov. Officials Training
- Advanced Job Training

Global Education for Cooperation & Network

- International Training
- Global Expert Program
- Global Network (AWEN)

Staffs

Educational Specialist & Staffs 44

Facilities Management Staffs 39

2014 Result

In-house 345 courses (12,600 persons)

International & Domestic 76 courses (1,700 persons)

Overview of K-water Academy



Facilities

- Lecture Rooms 10 (339 seats)
- Computer Rooms 2 (62 seats)
- Grand Ballroom 1 (280 seats)
- Dormitory 174 rooms (331 beds)
- Cafeteria 1 (324 seats)



2. HRD Strategy



Best Global Water Academy

Enhancing Global Competitiveness as the Smart Water Management Leader

Water Education Hub
Leading the future of water education with cooperative network

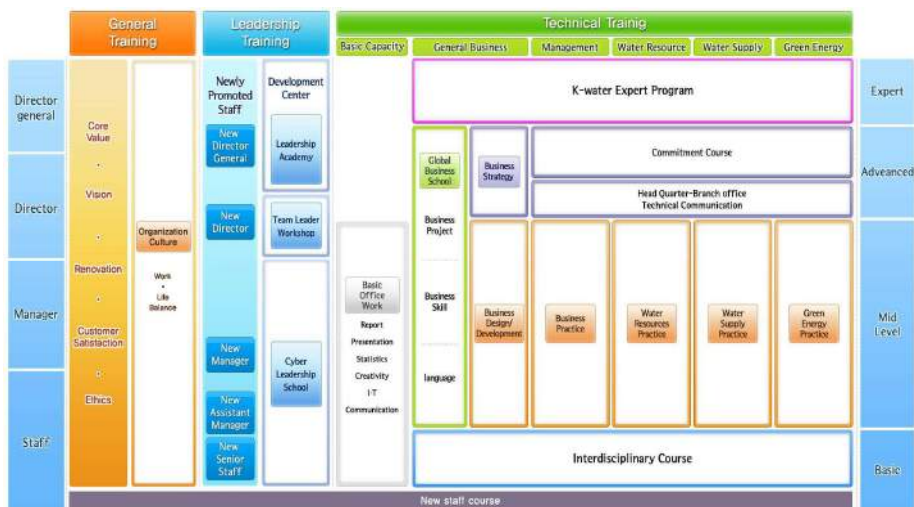
High Performance Orientation
The best provider of water education services

Global Infra Enhancement
The expansion of global education infra

3. In-house Program



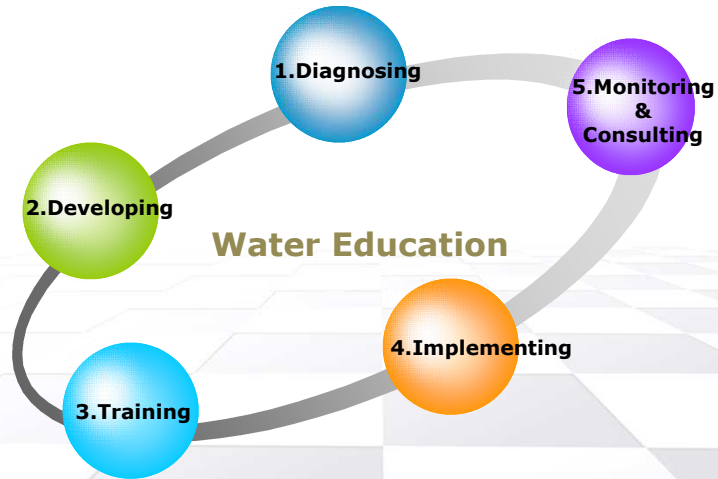
Over 340 courses operating annually



4. International Program



○ International Education Process



International Program



○ Training Features



○ **Training Course**

General Course	Water Resources		Water Supply & Sanitation	
	Water Resources Management		Drinking Water Management	
	Dam Planning & Construction		Water Works System Design	
	IWRM & Hydroinformatics		Drinking Water Analysis	
	Dam & Reservoir Operation		Drinking Water Treatment	
	Groundwater management		Water Treatment Facility Mgt.	
	Flood Forecasting Systems		Sewage & Wastewater Treatment Mgt.	
	Hydro-Electric Power Engineering		Drinking Water Administration	
Project Course	Field Diagnosis based Problem-Solving Training (Action Plan & Monitoring)			
Tailor-made Course	Optimum Training Course to meet Customer's Needs			

○ **Until Now**

Total	Indonesia	Cambodia	Iraq	Philippine	Thailand	Vietnam
82 Countries	293	218	218	168	113	109
	Sri-Lanka	China	Laos	Afghanistan	Bangladesh	Nepal
2,595 Trainees	105	323	74	69	61	65
	Guatemala	Mongolia	Egypt	Kenya	Peru	Others
	45	56	29	27	28	417

206 Courses, 2,600 Alumni
from 82 Countries until 2014

III Next Steps for the Future



Total Water Service Provider K-water

1. Water Issues are Changing



Smart Water Management Initiative

Global Cooperation & Network for Education

Water Resources Mgt.

Water Security (flood, draught)
Water Policy (master plan etc.)

Water Supply & Sanitation

Non Revenue Water
Water Quality

IWRM

Integrated Water Resources
Management
Hydro Power (generation)

Clean Energy

Developing Clean Energy
Tidal, Solar, Wind



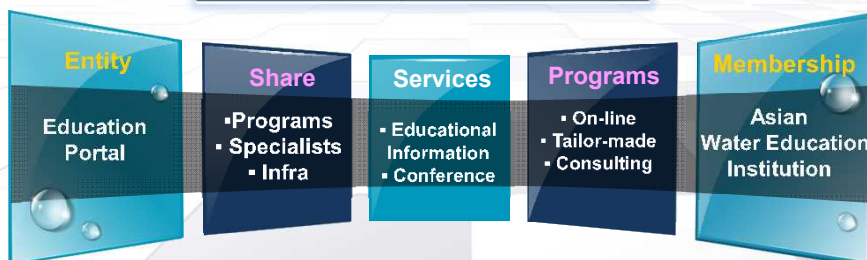
2. Main Topics from WWF 2015

○ Mutual Cooperation & Network Sphere



3. Proposal of AWEN

○ Asian Water Education Network Foundation



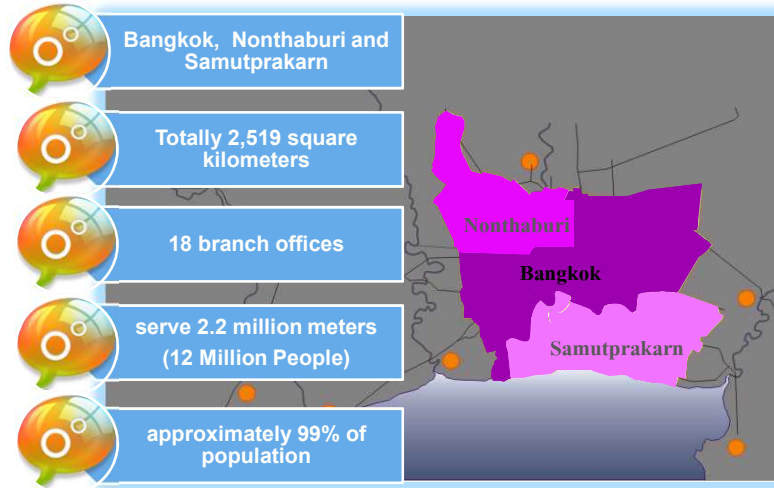
HR Integration: Moving Towards AEC

Metropolitan Waterworks Authority, Bangkok Thailand

Outline

- 1 About MWAIT
- 2 MWAIT's Roadmap for AEC
- 3 HR Integration
- 4 Internal Trainer Project

Company Profile



About MWAIT

About MWAIT

MWA Waterworks Institute of Thailand (MWAIT) was developed from MWA Waterworks Academy and it was formally established in 2014 which is responsible for providing training services for both technicians and engineers of local administrative organizations and municipalities in domestic and international countries.



MWAIT's vision & mission

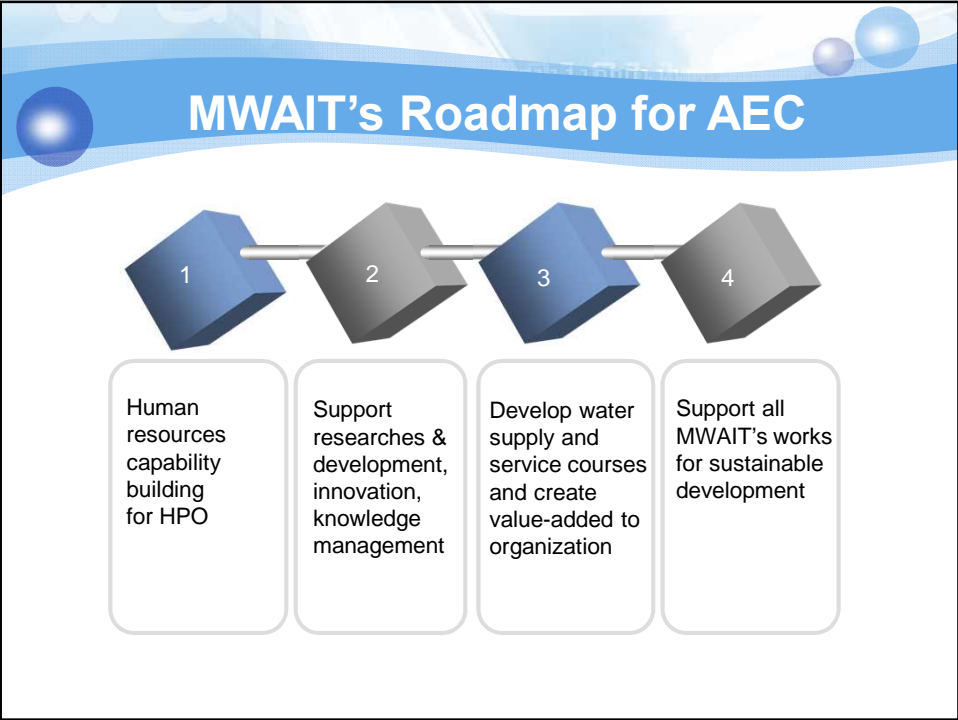
Vision

To be an excellence waterworks institute of ASEAN

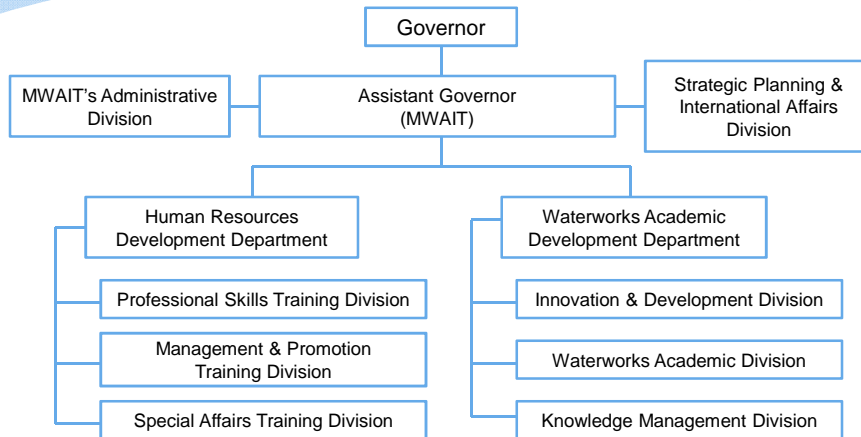
Mission

To develop knowledge about waterworks and professional staffs in waterworks, research & development and create innovation and value-added organization.



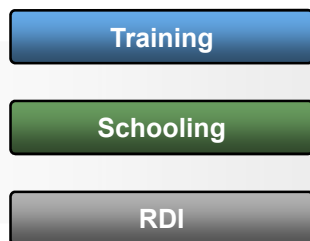


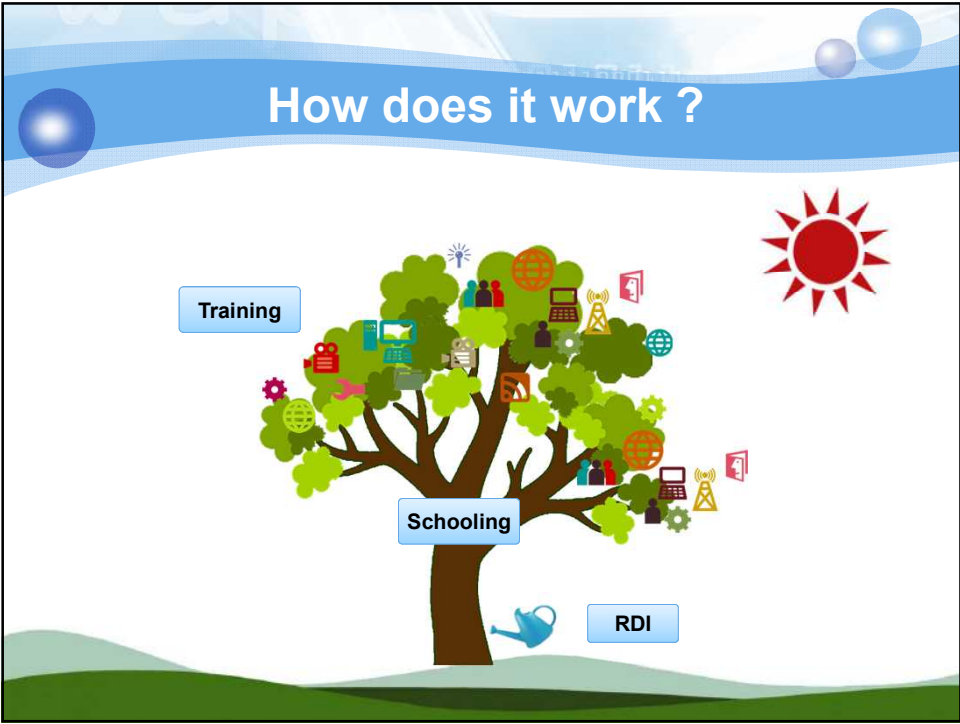
Organization Chart



Driving towards MWAIT's Goals

In 2015, MWAIT has set up the three working groups to drive the MWAIT's strategy in order to accomplish MWA's vision and mission and to be the leader of water supply professional institute of ASEAN





Domestic Training



In-house Training Program for MWA staffs

Domestic Training

Municipality



International Training

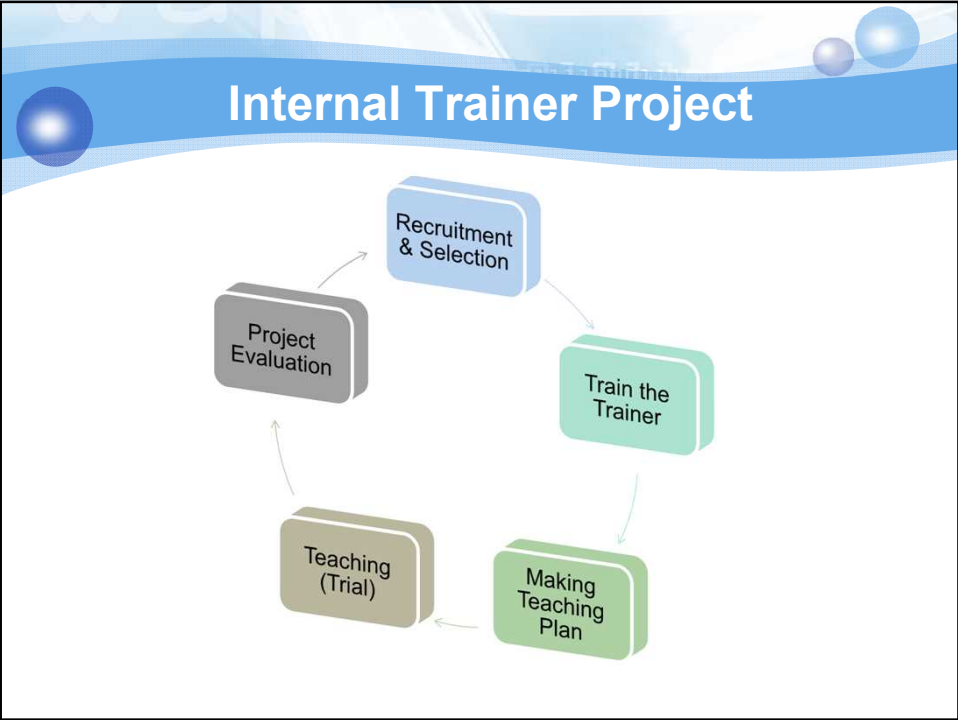


Training program under the collaboration with JICA ,
TICA and MOU

Schooling & RDI







English Trainer Project



Q&A
QUESTIONS & ANSWERS SESSION





Contents

I . General Status of Seoul Waterworks

II . Arisu Total Service:
Extensive Training Programs
for Enhancing Citizens' Satisfaction

A. Background

B. Overview : Arisu Total service

C. Opening the New Training Center

D. Training Courses for the Staffs

III . Conclusion

IV . Questions & Answers



I . General Status of Seoul Waterworks



General Status of Seoul Waterworks



❖ Arisu

- Old name for the Han-River in Goguryeo dynasty (BC. 37 ~ AD 668)



General Status of Seoul Waterworks



❖ Arisu

- Old name for the Han-River in Goguryeo dynasty (BC. 37 ~ AD 668)
- Name of Seoul' brand of tap water since 2004



4

General Status of Seoul Waterworks



❖ Arisu

- Old name for the Han-River in Goguryeo dynasty (BC. 37 ~ AD 668)
- Name of Seoul' brand of tap water since 2004
- Made in Seoul, Recognized Around the World!

June 2009 UN's Grand Prize in the public administration service category

Sep 2010 Global Water Industry Project Innovation Award

Sep 2012 Quality certification by the National Sanitation Foundation International (NSF)



5

General Status of Seoul Waterworks

❖ Mission

○ ARISU : Always, Reliable, Innovative, Smart, and User-friendly

Water Production

- Intensive water quality testing
- 100% advanced water purification system
- Chlorine re-dispersion facility

Water Distribution

- Zero interruption
- Above 95% of revenue water ratio
- Pipe-network maintenance project
- Direct water supply

Operation & Management

- Arisu total service
- AIIS ; Arisu Integrated Information System
- Arisu Small hydro-power plant
- Overseas support



6

|| . Arisu Total Service :
**Extensive Training Programs
for Enhancing Citizens' Satisfaction**

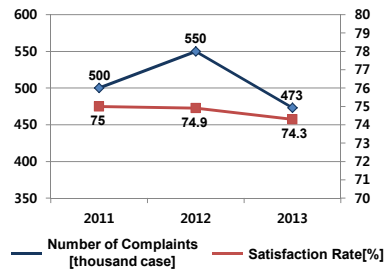


Extensive Training Programs

A Background

- ❖ To enhance citizens' satisfaction with tap water service
- ❖ Need of innovative, customer-centered complaint handling system
- ❖ Customer satisfaction rate is still low with 74.3% in 2013 although Seoul has endlessly worked to reach world-class quality

Total	Distribution (131,745 cases, 27.8%)		Bill-related (340,964 cases, 72.1%)	
	472,709	leak	34,277	transfer (move in/out)
pipeline		19,606	automatic payment	131,901
meter		16,629	exemption	51,197
other		61,233	other	42,686



<Analysis of customer complaints in 2013>



8

Extensive Training Programs

B Overview : Arisu Total service

- ❖ Arisu Total Service
 - Citizen-led, proactive approach to complaint handling
 - Shorter waiting time, rapid response to complaints
 - Comprehensive, integrated, one-stop service

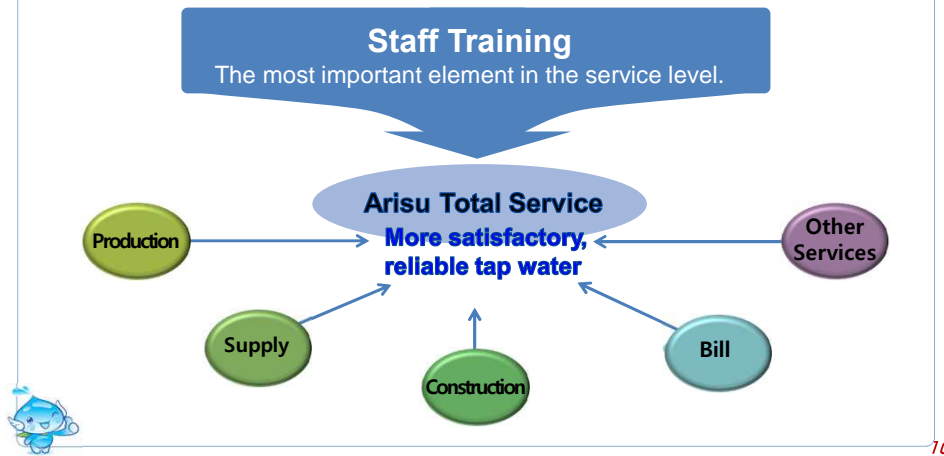


9

Extensive Training Programs

B Overview : Arisu Total service

❖ Arisu Total Service



10

Extensive Training Programs

C Opening the Training Center

❖ Training Center

- Location : Guui water purification plant, Main building 1st floor (276m²)
- Construction Period : April 2014 ~ August 2014
- Instructor : staff (with 10~20 years' experience), retiree, contract worker
- Trainee : 526 people from waterworks facilities in Korea
- Training program : Theoretical instruction, Field training



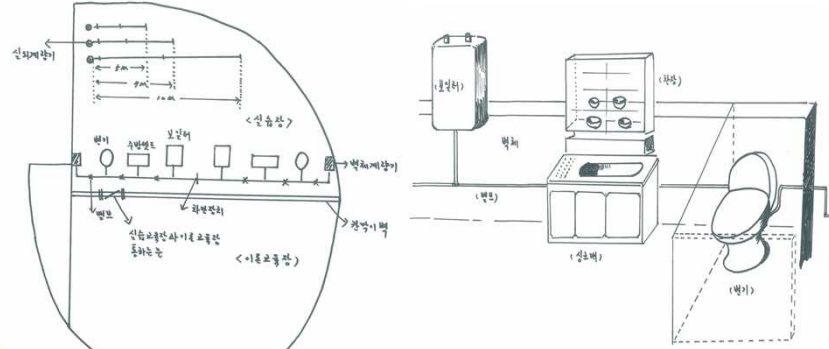
11

Extensive Training Programs

C Opening the Training Center

❖ Training Center

○ Rough sketch of the center



Extensive Training Programs

C Opening the Training Center

❖ Training Center

○ Structures based on the typical water supply facilities



Extensive Training Programs

c Opening the Training Center

❖ Training Center

- Structures based on the typical water supply facilities



14

Extensive Training Programs

c Opening the Training Center

❖ Training Center

- Basic theoretical instruction and field training



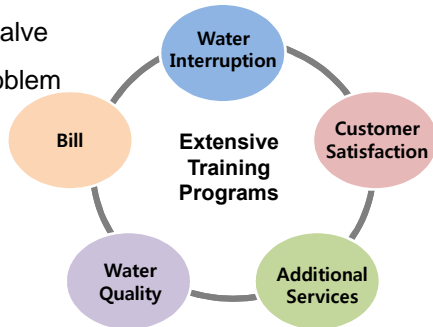
15

Extensive Training Programs

D Training Courses for the Staffs

❖ Water Interruption

- Leakage inspection of indoor pipes
- Fixing and replacing meter and valve
- Troubleshoot water pressure problem



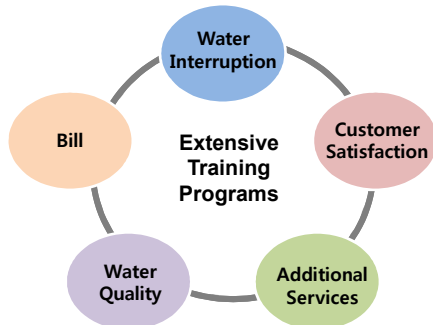
16

Extensive Training Programs

D Training Courses for the Staffs

❖ Bill-related

- Charging calculation
- Change of user name (relocation)
- Automatic payment (e-Payment)
- Bill separation in multiple family house
- Permanent disconnection of water usage



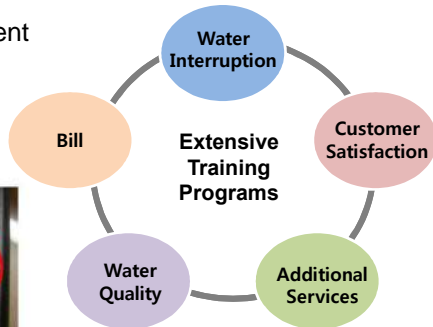
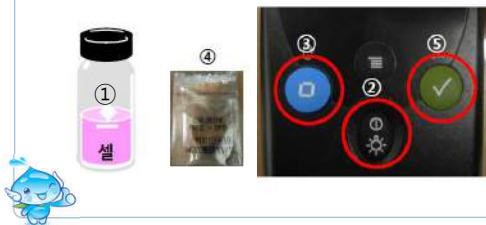
17

Extensive Training Programs

D Training Courses for the Staffs

❖ Water Quality

- Water quality check
- Instruction of measuring instrument
 - Turbidometer, pH meter
 - Residual Chlorine meter

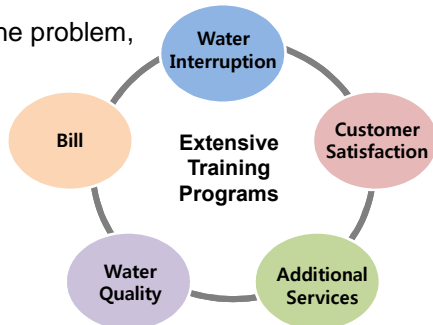


Extensive Training Programs

D Training Courses for the Staffs

❖ Customer Satisfaction

- Proper customer handling
 - Greeting, acknowledgement of the problem, offer assistance & resolution
- Going the extra mile
 - : resolving other problems



Extensive Training Programs

D Training Courses for the Staffs

❖ Additional Services

- Check the hygiene of chopping boards and other kitchenware
- Rust and residues check from faucets, washstand, etc.
- Advise restaurants to remove odor-causing materials
- Inform citizens of the best ways to utilize Arisu tap water



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Extensive Training Programs

D Training Courses for the Staffs

❖ Manual of Arisu Total Service

- Summarizing all training programs into a small handbook



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III. Conclusion

Conclusion



Conclusion

ARISU

Always, Reliable, Innovative, Smart, and User-friendly

Healthy,
tasty water
Production

Safe,
stable water
Supply

Best quality
Service

Staff Training

The most important element in the service level.



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Thank you
for your attention!



ARISU :
The Safest, Most Refreshing Water

Seoul
Together we stand

IV. Q & A

Human Resources Development in TWC



JUI-CHING LIN

Director

Department of Human Resources
Taiwan Water Corporation



The 8th Meeting of Asian Waterworks Utilities Network of Human Resources Development
October 27-29, 2015 in Tokyo



Outline

About TWC

Human Resources Department in TWC

Challenges of TWC

Training Park & GIS Institution

Conclusion



About TWC

3



History

Before 1974

1. Set up TWC by 128 water treatment plants in Kaohsiung City and Taiwan Province.
2. In 1972, the former Premier Chiang Ching-kuo gave instructions for setting up a water corporation.

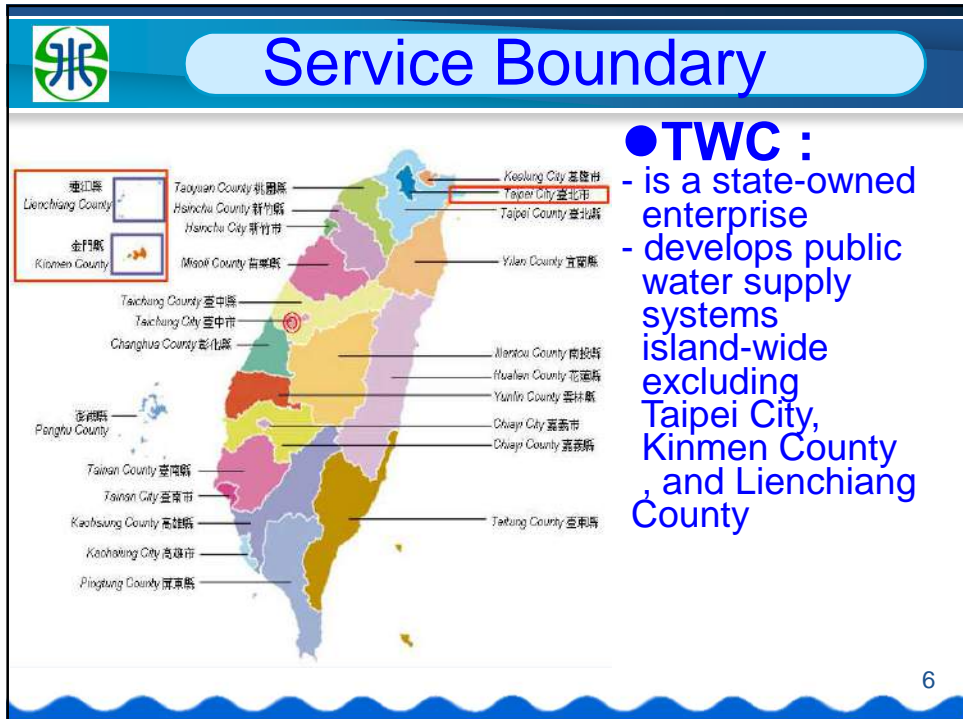
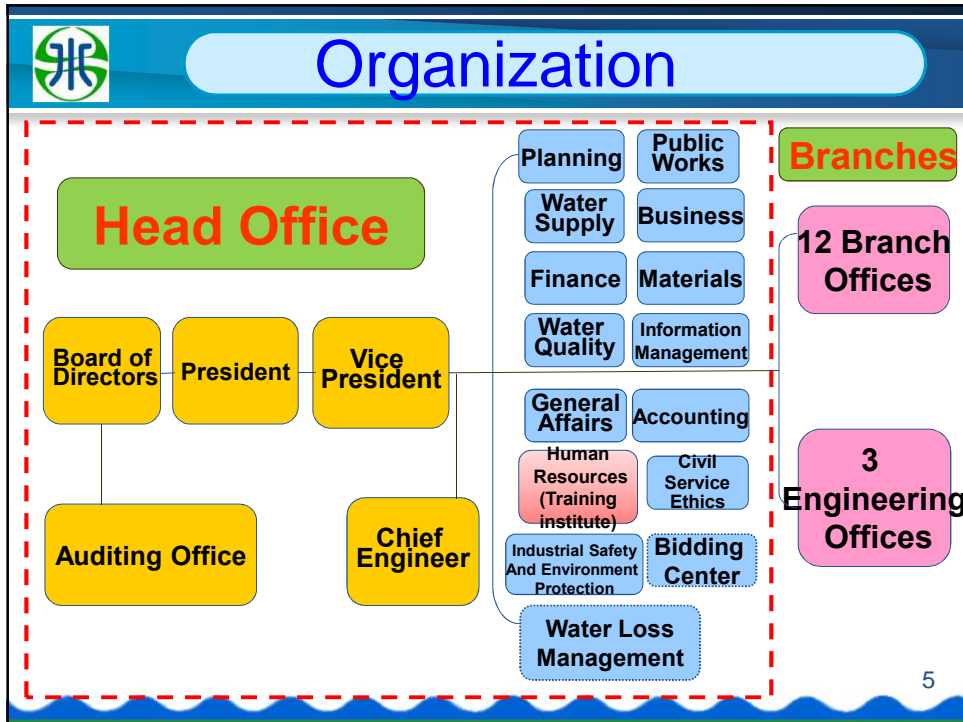
1974~1999

1. In 1974, TWC was set up by merging 128 water treatment plants.
2. TWC become public enterprise and was run by Taiwan Provincial Government.

1999~201~

State-owned enterprise run by Ministry of Economic Affairs after Reinventing Provincial Government

4





Water Supply Systems

Statistics

- ◆ Water Supply Systems : 149
- ◆ Water Sold Amount(km³) : 2,361,321
- ◆ Leakage Rate(%) : 18.04
- ◆ Water Sold Rate (%) : 73.86
- ◆ Water Supply Amount (km³) : 3,196,882
- ◆ Water Supply Capacity(km³) : 4,100,176
- ◆ Quality Acceptability(%): 99.94
- ◆ Tap Water Popularity Rate(%):91.81
- ◆ Customer Satisfactory Rate(%):88.22

本公司各區管理處及廠所分布圖
The location of branches, service centers, operations stations, and water treatment plants



Management Philosophy

- **QUICK** (hints at “efficient & speedy service ”) :
 - **Quality**
 - **Innovation**
 - **Credibility**
 - **Knowledge**

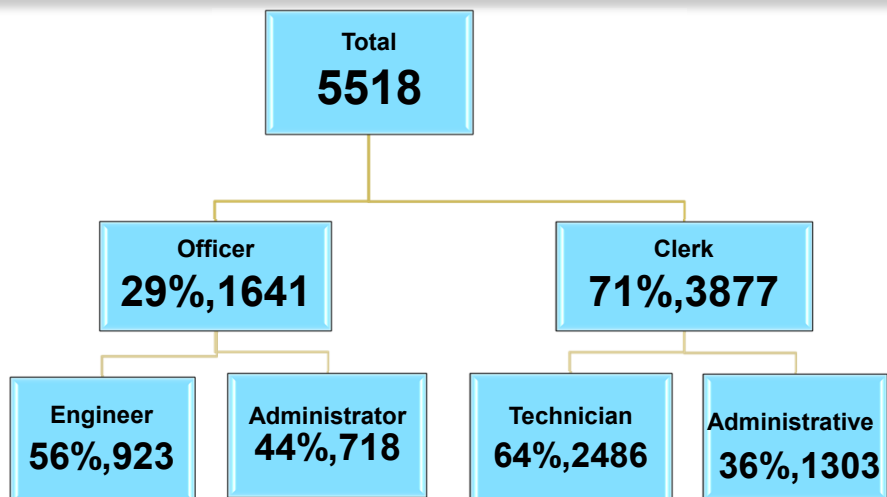


Human Resource Department in TWC

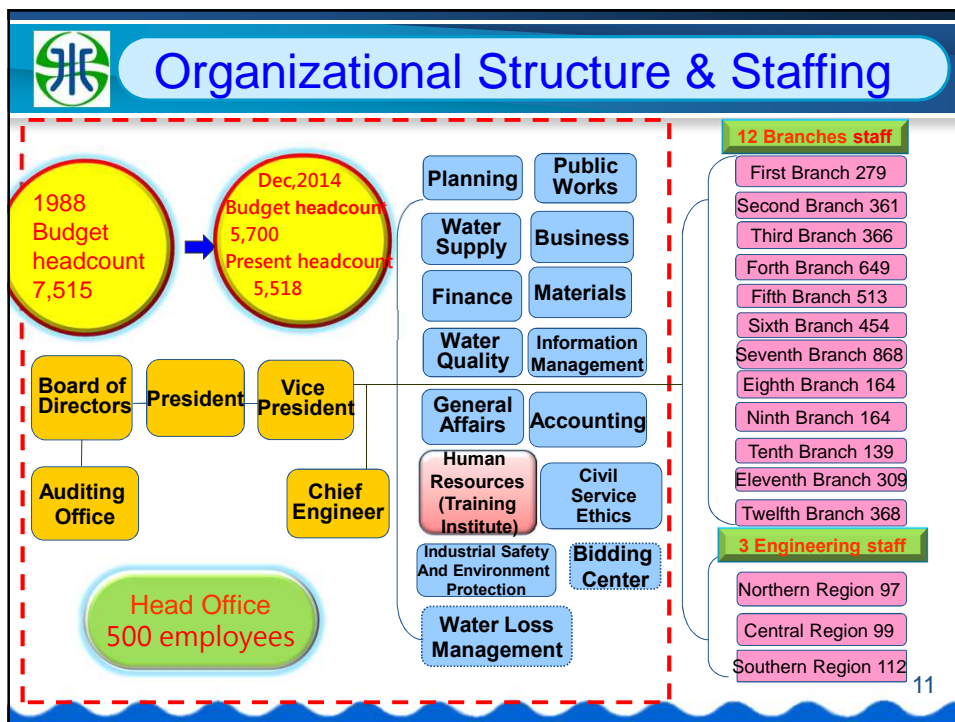
9



HR Structure of TWC



10



Employee Productivity

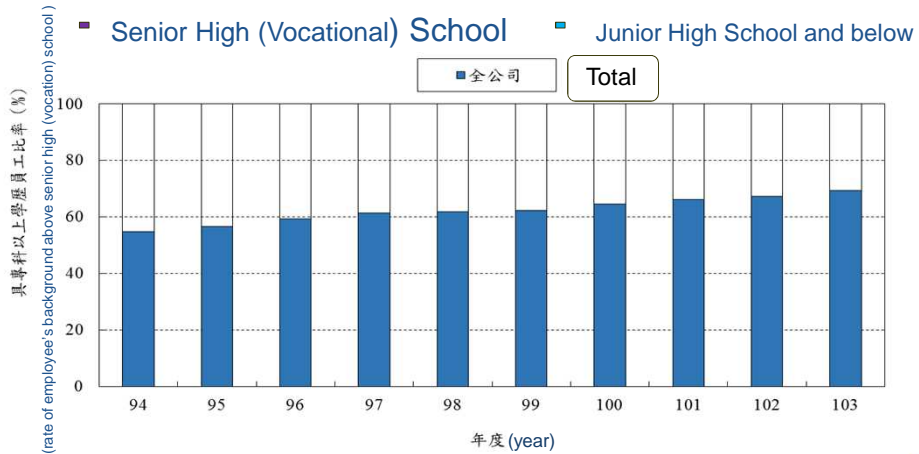
Item	Unit	2010	2011	2012	2013	2014	Growth Rate%
Pipeline Length	Km	57,210	57,753	58,123	58,944	59,288	+3.63
Water Sold	Mm ³	2,210	2,231	2,254	2,296	2,361	+6.83
Number of Connections	* 1000	6,282	6,366	6,452	6,550	6,651	+5.87
Average water sold per employee	* 1000m ³	406	413	415	420	428	+5.42
Average households served per employee	Connections	1,160	1,163	1,171	1,199	1,205	+3.88
Budget headcount	Employee	5,700	5,700	5,700	5,700	5,700	0

12



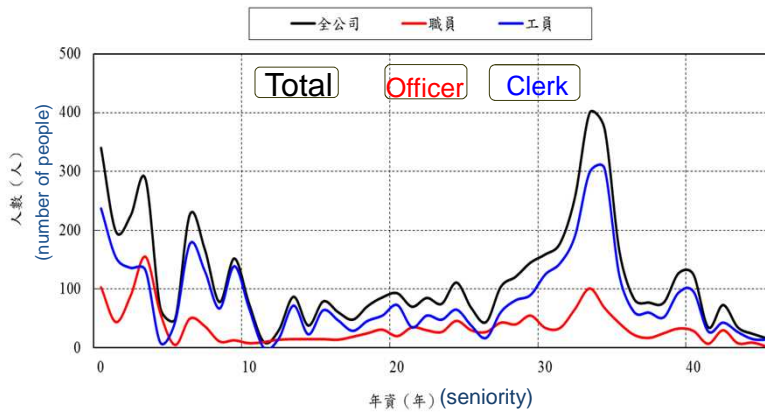
Education Background

- Doctor **69.45%**
- Bachelor
- Master
- College
- Senior High (Vocational) School
- Junior High School and below



Served Seniority of TWC's Employee

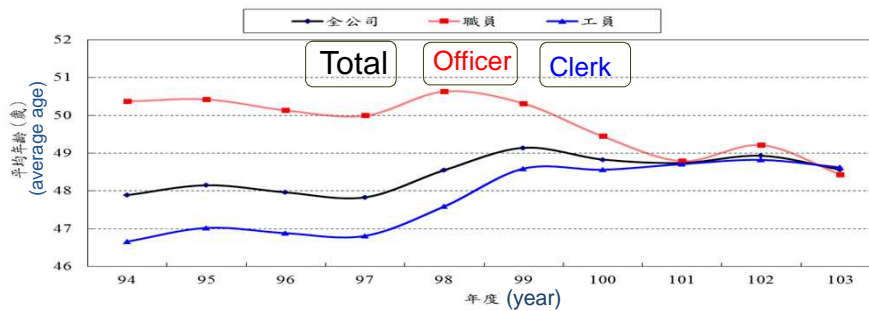
Avg. Served Seniority :21.13yrs.





Age of TWC's Employee

Item	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Average age	47.89	48.15	47.96	47.83	48.55	49.14	48.83	48.74	48.93	48.56
Officer	50.37	50.42	50.13	49.99	50.63	50.31	49.44	48.79	49.21	48.43
Clerk	46.66	47.02	46.88	46.81	47.59	48.59	48.56	48.71	48.82	48.62



Training

Item/year	2010	2011	2012	2013	2014
Training by MOEA	56	48	41	43	57
Training by PCC	67	62	76	56	57
Training By TWC (courses)	6851 (138 courses)	4365 (98 courses)	9622 (151 courses)	5751 (142 courses)	5393 (117 courses)
Overseas	3	6	5	7	9

*Ministry of Economic Affairs Professional Training Center.

*Public works quality control and management training.

*Training Institute, TWC

*Overseas: Dispatch staffs abroad to study or to attend training classes and seminars



Challenges of TWC

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Business Strategies(1/2)

Base on “internal, external environment variables(SWOT)” as the basis of the evaluation strategy and further through the utilization of “interaction matrix analysis” and “TOWS matrix analysis”, the business strategies are shown in the following form.

Qualitative Objective	Business Strategy
Focusing on the core competence , carry out high quality and plenty volume	<ul style="list-style-type: none">● Exploiting multiple water resource● Reducing leakage rate● Promoting back-up capacities● Strengthening emergency response capabilities● Enhancing water quality management
Promoting lean services, move customers from the heart	<ul style="list-style-type: none">● Promoting lean service● Creating asset of hydrophilic experiences● Increasing tap water popularity rate



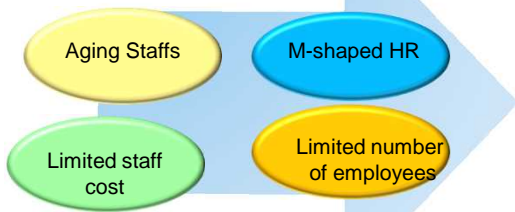
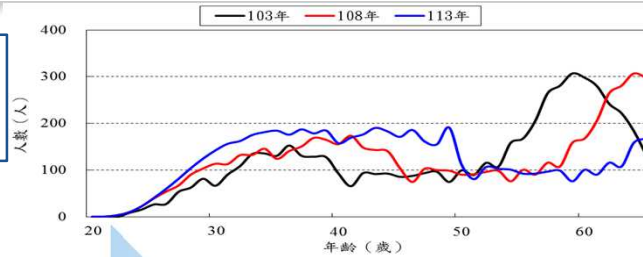
Business Strategies (2/2)

Qualitative Objective	Business Strategy
Cultivating virtues and talent, continue to optimize organization	<ul style="list-style-type: none"> ● Promoting the renewal of humans ● Upgrading management system ● Reinforcing engineering and program management ● Building up informational competitiveness
Governance by accountability, carry out social responsibility	<ul style="list-style-type: none"> ● Perfecting the legality of incorruptness ● Executing corporate governance ● Fulfilling corporate social responsibility
Fulfilling energy saving and environmental protection, make resource sustainable	<ul style="list-style-type: none"> ● Accomplishing our green proposition
Cutting costs and increasing revenues, improve financial structure	<ul style="list-style-type: none"> ● Increasing revenue ● Cutting cost



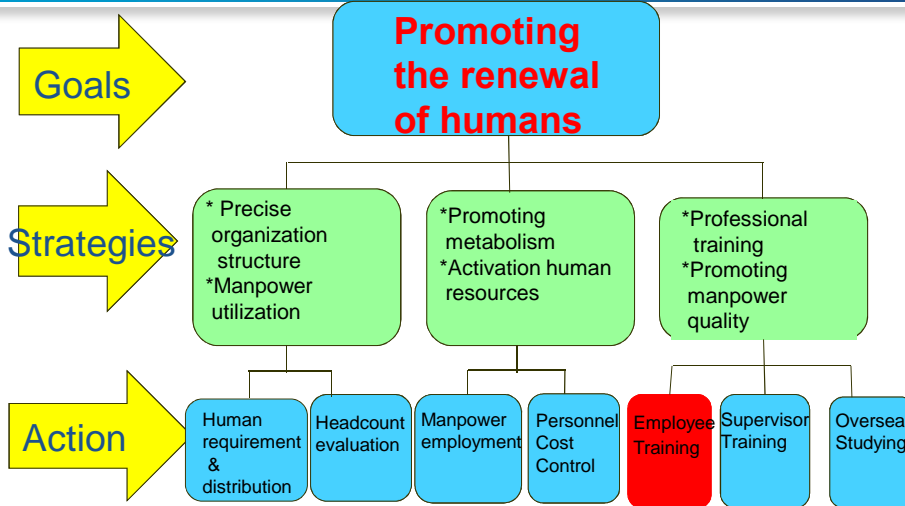
Human Resources Weakness

Staff of age in 2014、2019、2024

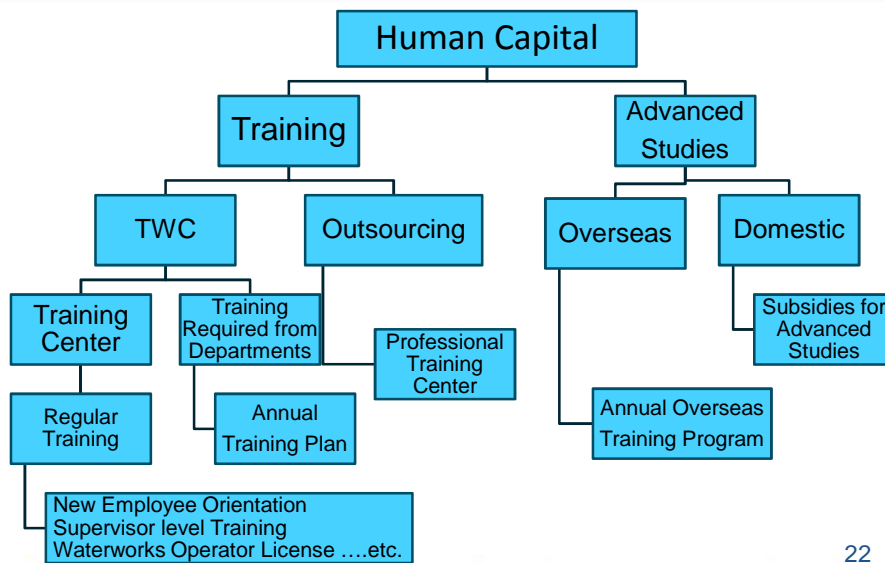




HRM Policy



Training Systems(1/3)





Training Systems(2/3)

Head Office

15 Departments

- Planning
- Water Supply
- Finance
- Water Quality
- General Affairs
- HRD
- Industrial Safety & Environment Protection
- Water Loss Management
- Public Works
- Materials
- Information Management
-ect.

Training Center of TWC

Manpower Planning

Placement

Evaluation & Training

Make annual training plan

Wage & Benefits

Training Center

To arrange the related courses based on the plan of the evaluation and training division (Speaker, attendee, dormitory, etc.)

Location : Taichung (30 minutes drive from Head Office)

Organization : Chief(1) Officer(2) Clerk(6)

Facilities : classroom(2) / IT training rooms(2) / training area reading room / dormitory / parking place...etc.

Class Size : Over 117 classes in 2014

Over 5,393 number of people took training in 2014

23



Training Systems(3/3)

To Become An Expert of Waterworks

New Employee

Regular Employee

Supervisor Level

Expert of Waterworks

Technician · Office worker

Engineer · Administrator

Expert

New Employee Training

- ※Obtain Waterworks Operator License
- ※Job Rotation (within division)
- ※Expertise Training of Job Related
- ※Overseas

- ※Supervisor Training Classes
- ※Job Rotation (between divisions)

24



Training Park & GIS Institution

25



Technical Training

- The global climate change and greenhouse effect deterioration , which lead to the uncertainty of Taiwan hydrology , the uneven of flood-dry period rainfall, as well as the elevating threat of water shortage, have heavily increased the pressure of water supply stability for water utilities .
- To overcome the operating difficult ,technical training is a kind of human resources development.
- For example ,TWC , The two themes :
 - 1.We established a training institute in the south of Taiwan.
 - 2.We develop and train staff that can use technologies such as GIS(Geographic Information System) .

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Training Park (1/3)

Institute

Training Park

Support
and
Study

- 8th Meeting of the 16th Board of Directors of TWC
- 1046th Manager Meeting of TWC
- To Study "Training and Technical Development Center Bureau of Waterworks TMG "

Analyze
the
Reasons

- Small training institute
- No physical building for displaying water supply equipment and technology training
- Incomplete new employees training
- React the training effect

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Training Park (2/3)

Facilities

- Education Building
- Dormitory
- Professional Training Location (inside)
- The planned total fund of NT \$526.4 million
- Estimated completion in spring 2019

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Training Park (3/3)

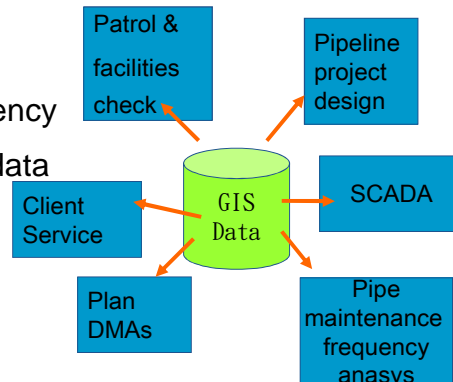
Deployment Layout of New Training Park



GIS Institution

GIS Data Application

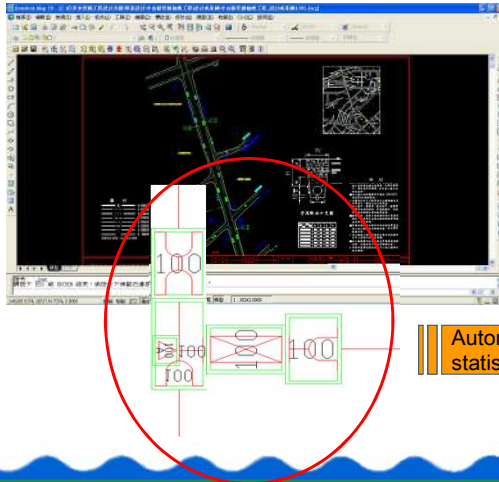
- Pipeline project design
- Client Service
- Patrol & facilities check
- Pipe maintenance frequency
- Supervisory control and data acquisition (SCADA)
- Plan DMAs





Pipeline Project Design

Improve the efficiency and accuracy of traditional paper design work.



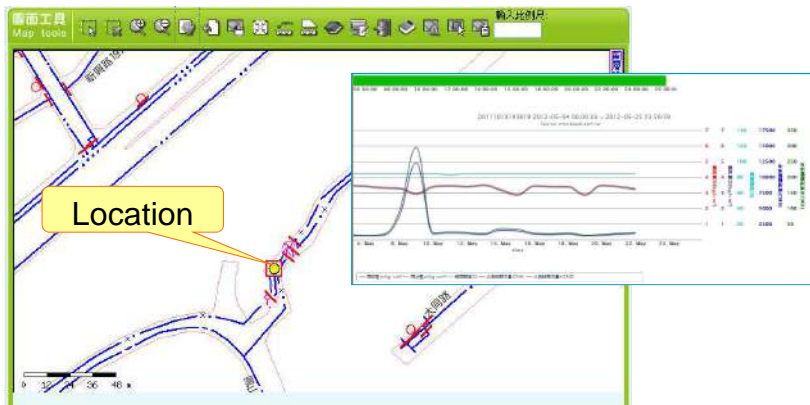
Automatic statistics

井号	井深	井径	井底	井口	井底	井口	井底	井口	井底	井口
1	1000	1	1	0	0	1	1	1	1	1
2	1000	1	1	275	275	1	0.5	1	0.648	2000.014
3	1000	1	1	153	153	1	0.5	1	0.648	2000.014
4	1000	1	1	153	153	1	0.5	2	0.648	2000.014
合计	4	4	4	54.6	54.6	4	2	4		



SCADA

Locate SCADA information such as flow and pressure.





Training

- 2005-2009 : Training on operating workers and general users.(60Px 30Hrs.x12 Branches)
- 2008 : Training on superintendents(30P)
- 2009 : Advanced software training(120P x 20Hrs.)
- 2011 : Training on operating workers. (30 Px 20Hrs.)
- 2009 to 2015 : Training on General users.(Held by branches.)
- 2016:Training on operating workers and general users.(30Px 35Hrs x 4Sessions)

33



Conclusion

34



Conclusion

Water is the source of life . It nourishes the earth and all living things, leading to human civilization ! We are now facing with global climate change all around the world.

By means of absorbing knowledge through previous meetings of the organization , we are eager to resolve issues related to water supply and to fulfill the responsibility of member of the Earth .

In addition , welcome to Taiwan to visit our training park.

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Thank you for your attention



Cheng ching Lake, Kaohsiung

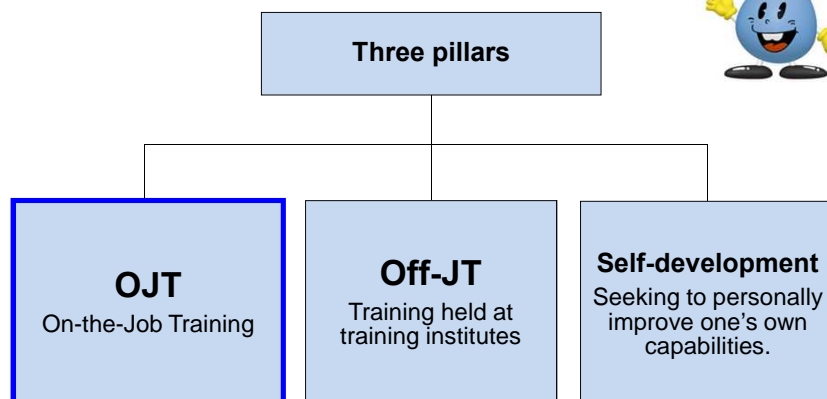
36

The Development Of Human Resources at the Tokyo Waterworks Bureau

Seiji Kaneko, Director, Facility Section
Tama Water Supply Management Office
Bureau of Waterworks, Tokyo Metropolitan Government

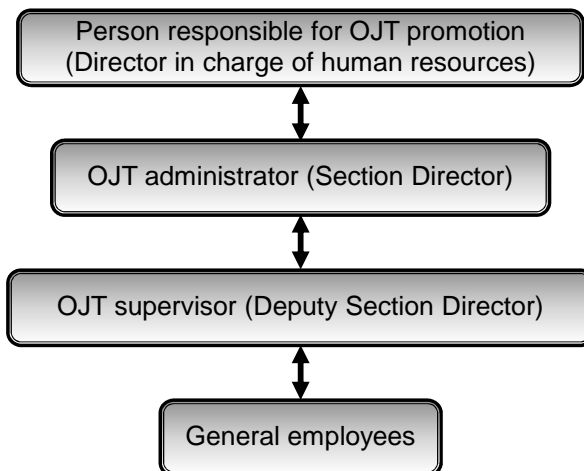
1

Human Resources Development System



2

Promotion System at Each Workplace



3

How to Implement OJT

- **Systematic development based on the OJT plan**
 - Set training targets (needs for OJT).
 - Formulate a plan to achieve the targets.
 - Assess the results.
- **Mid way assessment (October)**
- **Final assessment (March)**

4

Implementation within a Team

1 Trainees

Newly hired employees

Employees transferred from outside the Bureau

Employees transferred from within the Bureau

2 Implement OJT in each team

Each team should prepare a copy of a plan.

5

Support for OJT Establishment & Vitalization

Tokyo Waterworks OJT Manual


Training and Technical Development Center
Bureau of Waterworks
Tokyo Metropolitan Government

Manual

平成 年度 OJT計画書	
所属部署	担当部署
課長	課長、主任、係長、技士
担当部署	
職種	
職種	
1. PLAN	
OJTの目的・目標	
(Expected standards)	
現行標準	
(Current standards)	
研修目標	
(Targets for training)	
2. EXECUTION	
研修の具体的な内容	
(Concrete programs & schedules)	

OJT Plan

6

1-1 Examples of OJT: Civil engineers

OJT at the Water Supply Division

Small distribution pipe plumbing

Laying of water supply equipment and pipes

Leakage prevention work



Improvement of techniques

Development of good judgement in supervising actual work

7

1-2 Examples of OJT: Civil engineers



(1) Pipes connection with earthquake-resistant joints



(2) Gate valve leakage repair



(3) Small distribution pipe leakage repair



(4) Leakage investigation

8

2-1 Examples of OJT: Water examiners

ISO/IEC 17025 Certification

- **Proof** that the water examination facility has a well-developed management system, **and that the examiners have the necessary skills.**



Tama Waterworks Water Examination Facility

- **Certified in March 2007**
- **Only highly skilled examiners implement water examinations.**

9

2-2 Examples of OJT: Water examiners

Education & training

- **ISO certification items: Learn through lectures and practice with certified engineers**



Help trainees understand work processes and how to handle analysis equipment.



Train trainees so that they can perform water examinations with a high level of precision.



10

3-1 Examples of OJT: Machinery/electrical engineers

OJT at Higashimurayama Purification Plant

FY2015 Technical Succession Training for Maintenance Engineering

	Name	Content
1 st	Welding and cutting	Explain how to handle welding/cutting machines and practice how to weld.
2 nd	Protective relays	Explain how to handle protective relays and practice how to test them.
3 rd	How to tie ropes	Practice tying knots in ropes.
4 th	Maintenance of submerged pumps and motors	Practice disassembly and assembly including parts replacement.
5 th	Drilling, punching, tapping, dice cutting	Metal processing using a drill, tap and dice.
6 th	Steel pipe thread cutting	Explain how to use a pipe thread cutter and practice pipe thread cutting.

11

3-2 Examples of OJT: Machinery/electrical engineers



Protective relays



Arc welding



Ropework



Motor overhauling

12

4-1 Examples of OJT: Forest engineers

– Introduction of water conservation forests –



Ogouchi Reservoir

Functions of forests:

- (1) Store water
- (2) Prevent sediment discharge
- (3) Clean water
- (4) Absorb CO₂

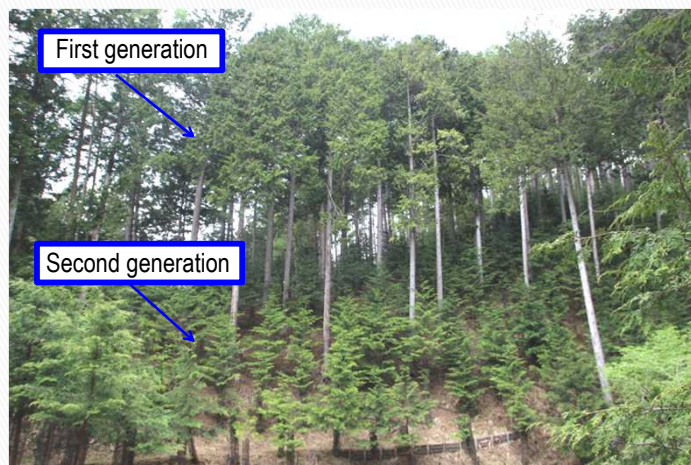
Potable delicious water comes from rich forests!



13

4-2 Examples of OJT: Forest engineers

– A feature of water conservation forests – Multi-stored forests



14

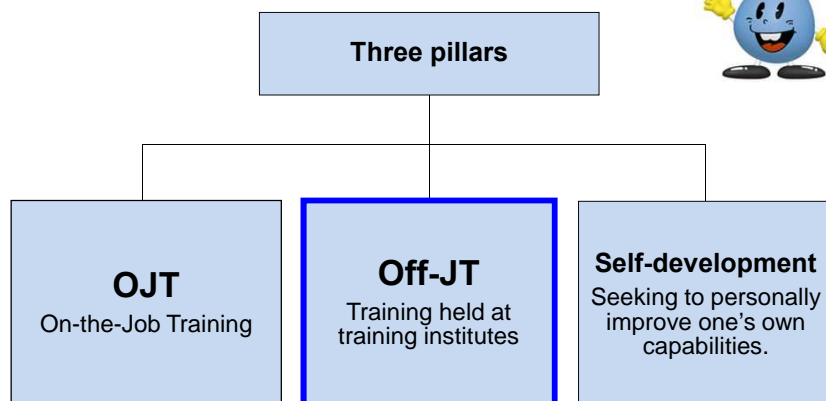
4-3 Examples of OJT: Forest engineers – Standing tree research –



Measure distance between trees.

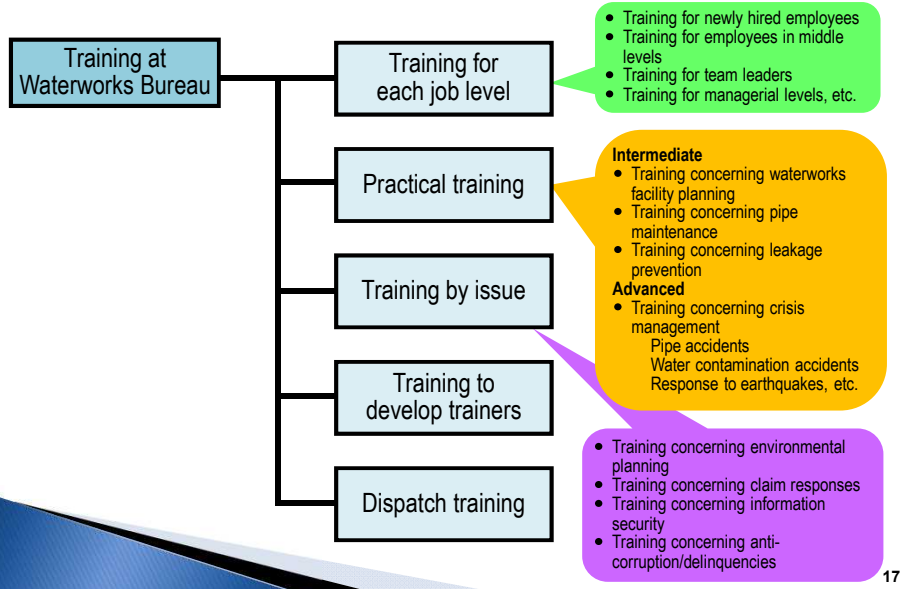
15

Human Resources Development System



16

Training System (OFF-JT)



Facilities of the Training and Technical Development Center



Facilities of the Training and Technical Development Center

Classroom



Electricity training room



Machine training room



Training facility for large-diameter piping



Training facility for small-diameter piping



Water treatment training plant



Experience-type Training Scenes

Leakage investigation training



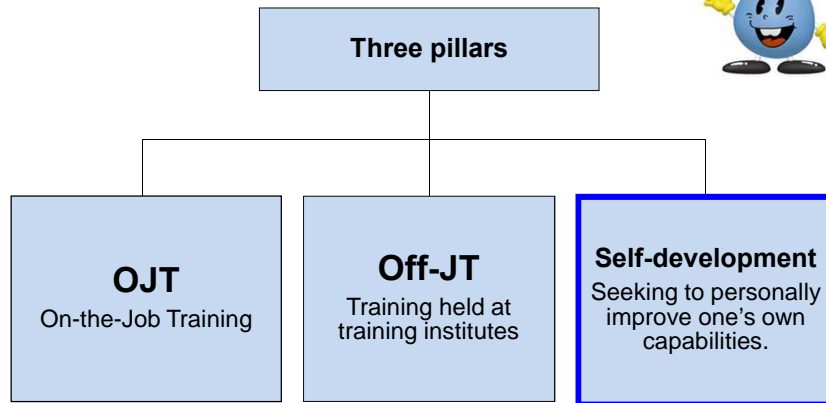
Leakage investigation training



Leakage repair training



Human Resources Development System



21

Self-Development Support

Content of support	Items	Expenses granted	Expenses borne by TMG		Conditions for support
			Ratio	Upper limit	
Support to acquire a qualification	77 qualifications	Examination fees	100% of the expenses covered	None	Pass the examination
		Mandatory training		None	
		Training to prepare for examinations		60,000 yen	
Support to have a training course	109 training courses	Course fees	50% of fees covered	None	Completion of the training course

22

Thank you.

