ICUS Newsletter

Volume 13 Number 3 Oct. to Dec. 2013

International Center for Urban Safety Engineering
Institute of Industrial Science, The University of Tokyo

Water Management in Vietnamese Cities: Present State and Vision for the Future

By Viet Anh NGUYEN
Associate Professor and Vice Director, Institute of Environmental Science and Engineering (IESE)
National University of Civil Engineering, Vietnam

Urban water supply

Water is a crucial component of life in any city. The water issue is often becoming more and more crucial in fast growing megacities. As of June 2013, there were 765 cities and towns in Vietnam providing residence for more than 32% of the total population of the country. The total design capacity of urban water supply systems is about 6.5 million m^3/day, while the actual operation capacity is 5.7 million m^3/day or 89% of the design capacity. The average ratio of urban population served by centralized water supply systems is 77% or 32.6 million persons. An average water consumption rate is a 101 l/cap/day, ranging from 33 to 213 l/cap/day (Figure 1). The average energy consumption for each cubic meter of water produced is 0.35 KWl/m^3, ranging from 0.18 to 1.0 KWh/m^3. The cost of energy on average is 26.3%, ranging from 4.2% to 47.6% of total water system operation and maintenance costs.

Adequate distribution of water among users while ensuring water source protection is one of the most crucial issues facing Vietnamese urban water supply. Master plans for urban and industrial water supply for core development zones in Vietnam are under development and revision. Other key issues in urban water supply in Vietnam include: (1) surface water scarcity, salt intrusion, usage conflict; (2) groundwater depletion; (3) non-revenue water: (4) water pollution (NOMs, industrial chemicals, pathogens, chlorine disinfection, etc. in surface water, organic and nitrogen compounds, arsenic, salt intrusion, etc. in ground water); (5) poor Operation & Maintenance

Hanoi city, Vietnam

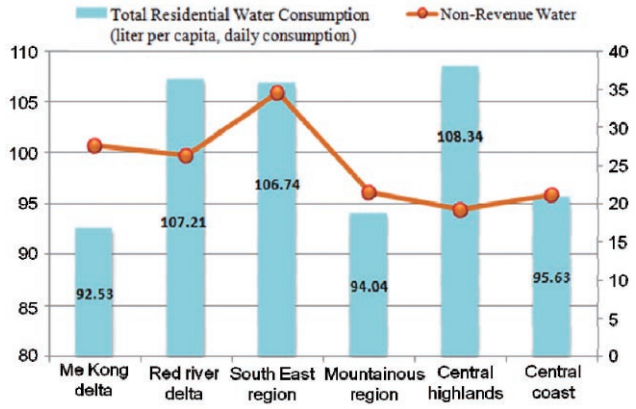


Figure 1 Average water consumption in urban households from 6 regions in Vietnam

(Source: Ministry of Construction – World Bank (MOC-WB), Urban water sector database, 2013)

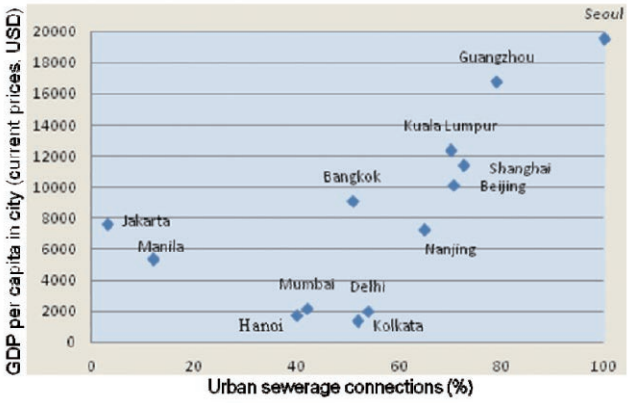


Figure 2 Urban sewage connections against city GDP per capita

(Source: East Asia and the Pacific (EAP), Sanitation review, World Bank, 2013)

capacity, especially for peri-urban and rural water supply systems; (6) need for process optimization, energy savings, efficient management; and (7) privatization, self financing capacity and cost recovery at water utilities.

Urban waste water management

Over the last three decades, a legal framework for environmental protection, urban and rural infrastructure development in general, and sanitation or wastewater management in particular has been making significant steps forward. The first Environmental Protection Law was issued in 1995 and its Revision issued in 2005. The Environmental Protection Fee imposed to urban and industrial wastewater began to be enforced in 2003. Effluent standards for different types of wastewater have been set up. Access to toilets is now 94%, with 90% of households using septic tanks as a means of on-site treatment. 60% of households dispose of wastewater to a public sewage system, primarily comprising combined systems. By September 2013, some 20 urban wastewater systems had been constructed in Hanoi, Ho Chi Minh City and other provincial towns and cities, with a total capacity of 600,000 m^3/day. Meanwhile, some 30 new wastewater systems are in the design/construction phase.

Despite the above-mentioned impressive initiatives, urban sanitation continues to face critical issues that need to be urgently addressed as follows: (1) most urban sewage and drainage systems are combined, with low household connection rates (especially in low density urban and peri-urban areas and in urban areas of central region where soil is mostly sandy), and only 10% of wastewater is being treated; (2) only 4% of sewage is treated, and fecal sludge management is generally poor in most cities; (3) cost recovery of the capital and O&M costs of the wastewater systems are generally low (Figure 2); (4) institutional arrangements do not encourage efficient system operation with the wastewater enterprises having limited autonomy to manage operations and undertake system development; (5) financing needs are still very high, and are estimated at USD 8.3 billion to provide sewer service to the estimated 2025 urban population of 36 million; (6) lack of understanding by decision makers of appropriate technical solutions and the limited land available for the Wastewater Treatment plants (WWTPs) has resulted in the construction of expensive treatment facilities with advanced technology and imbalance with household connection and network investment; (7) an integrated river basin management concept is not being applied; (8) urban sanitation planning

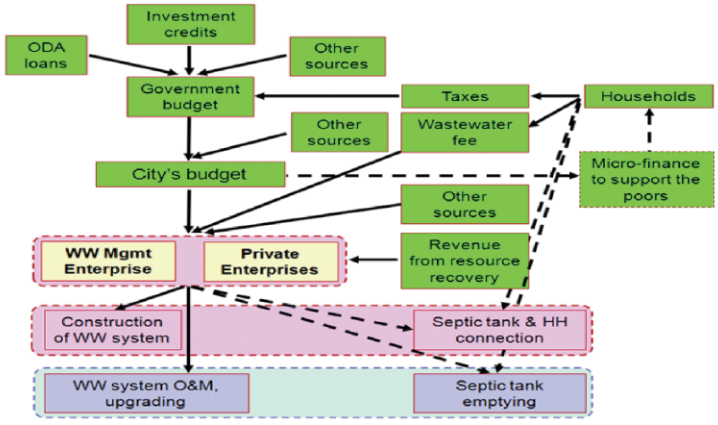


Figure 3 Recommended sources for funding in urban water and wastewater systems

is not being included properly in master urban planning and planning of other development plans; and (9) is limited participation from the private sector in urban wastewater management activities.

Recommendations for sustainable urban water management in Vietnamese urban areas

Analyzing the current state and evolution trend over the last 20 years, the author would like to propose the following recommendations aimed at sustainable urban water management in Vietnamese urban areas.

(1) The principles of integrated water resources management and a river basin approach should be applied as a means of achieving coordination across sectors and reduction of the current sector fragmentation. Sanitation planning on a citywide or river basin wide basis should be initially conducted prior to mobilization of investment and implementation. The sanitation plans should carefully consider the performance of low cost technology options and delivery approaches to provide efficient and affordable solutions for the range of physical and socio-economic conditions present in a city or river basin.

(2) The current commitment by central government to water and sanitation improvement needs to be sustained. Co-ordination of government-donor dialogue on sector financing at a high level and among government agencies at central and local levels needs to be improved.

(3) Besides Official Development Assistance (ODA) and state budget, additional financing sources for sanitation investment need to be mobilized (Figure 3). Government grants in the short to medium term may change in the longer run to other instruments, such as issuance of government bonds, the introduction of property taxes and the introduction of earmarked increases of personal income taxes. Increase of wastewater tariff is a key tool to achieve O&M cost recovery and system sustainability. Policies to encourage Public-Private Partnerships (PPP) and Private Sector Participation (PSP) are to be developed and implemented. Policies such as favorable loan and tax conditions are needed to encourage the private sector to invest in resource recovery from wastewater and sludge treatment including the use of reclaimed water and the production of wastewater-driven electricity and heat for sale to the grid.

(4) Flood management should be implemented based on the river basin management approach where appropriate "less impact development" solutions should be considered. Storm water flow delay and attenuation using natural and constructed systems are now widely used under the concept called "Sustainable urban drainage solutions – SUDS." Legal framework and system of design standards should be developed accordingly. Harvesting and storage of storm water can also lead to other benefits such as the use of stored water for fire fighting, toilet flushing, gardening, air conditioning, etc.

(5) Safe and efficient resource recovery should be targeted in sanitation planning. The reuse of treated wastewater and sludge would bring significant benefits to the integrated sanitation system. The technical solutions, with an integrated treatment of the different waste fractions – for example, septic tank sludge, sludge from future wastewater treatment plants, as well as organic wastes – should be encouraged. The produced biogas caters to energy self-sufficient operation of the plants. The digested sludge (residue) is further treated and utilized for hygienically safe fertilizer to improve soil quality, as it contains rich nutrients and organic fibers ideal for plants (Figure 4).

(6) Engineered facilities should be designed together with "soft interventions'' such as capacity building and institutional and financial arrangements. In addition, Information, Education and Communication (IEC) programs to promote behavioral change should be implemented to raise public awareness and appreciation of the benefits of water, hygienic practice, and environmental sanitation.

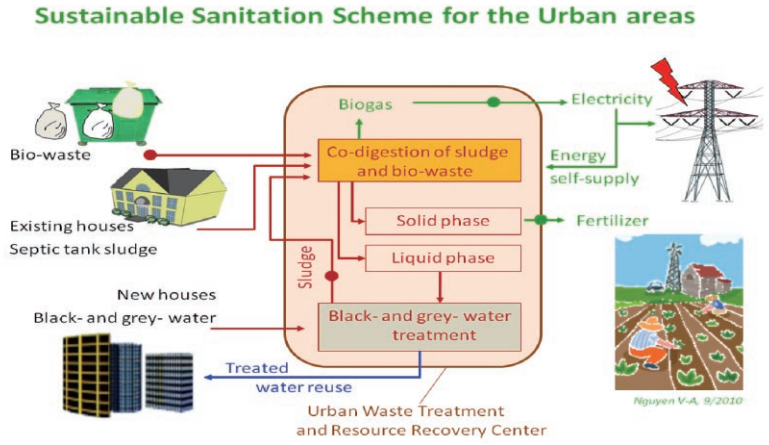


Figure 4 Scheme of integrated waste management system

USMCA 2013 in Hanoi, Vietnam

By Dr. Nguyen Hoang Giang

The 12th International Symposium on New Technologies for Urban Safety of Mega Cities in Asia (USMCA 2013) was held during Oct 9-11, 2013 at Hilton Hotel Hanoi & the National University of Civil Engineering (NUCE). The symposium was jointly organized by NUCE, ICUS and the Vietnam Federation of Civil Engineering Association (VFCEA). It was held under the auspices of the Ministry of Construction, Ministry of Science and Technology, Ministry of Education and Training, JICA and JSCE. Among the 155 submitted papers, 131 papers were presented in 10 parallel sessions along with 7 keynote speeches. Leading companies and institutions prepared 12 exhibition booths at the symposium as a platform to disseminate their activities.

The inauguration of the symposium was chaired by Dr. Le Van Thanh, President of NUCE and the message of the University of Tokyo was read out by Prof. Kimiro MEGURO, director of ICUS. Mr. Hirofumi MIYAKE, councilor, Embassy of Japan in Vietnam; Dr. Nguyen Dinh Toan, Deputy Minister of Construction; and Mr. Fumihiko OKIURA, Senior representative of JICA Vietnam, also spoke at the inauguration ceremony.

Seven keynote speakers delivered interesting and precious information in several topics: Dr. Hiroshi DOBASHI, President, Shutoko Engineering Co., Ltd., Japan; Prof. Phan Quang Minh, Dean of Building and Industrial Engineering Department, NUCE; Mr. Tran Nhat Thanh, President, Delta Corporation; Dr. Hisaya KAMURA from JFE Steel Corporation; Prof. Taketo UOMOTO, Chief Executive, Public Works Research Institute; Prof. Nguyen Viet Anh, Vice Dean, Environmental Engineering Department, NUCE; and Prof. Hiroshi NAITO, Professor Emeritus, the University of Tokyo.

The symposium covered essential topics for urban safety of mega cities, namely; disaster response and recovery, risk assessment, prediction, and early-warning; decision-making technologies; planning and development of urban infrastructure systems; lifecycle management of infrastructure systems; climate change mitigation and adaptation; development and application of sustainable technologies; application of geospatial technologies; and case histories of urban constructions.

At the end of the symposium, the Excellent Young Researcher Award – prepared by ICUS to encourage the activities of young researchers – was awarded to six young researchers from various universities from several countries (see the details in page7). Moreover, pre- and post symposium tours were also held. A tour of Hanoi and a technical tour to Nhat Tan Bridge, the biggest bridge in Vietnam, was carried out on the pre-symposium day. The tour of Ha Long Bay, the world heritage site, on Oct 11, 2013 provided a beautiful and memorable trip for the international participants on the last day of the symposium.

In brief, the Proceedings of USMCA2013 will be a valuable reference for policy makers and researchers. USMCA2013 has created a forum for both international and domestic engineers and practitioners to meet and widen their networks. Professors and experts were impressed with the image, the people and the hospitality of Vietnam. Hanoi, with the autumn fragrance of milk or "sữa" flower and the diversity of cuisine, created many unforgettable memories. USMCA2013 has concluded and valuable experiences were exchanged and recommendations from experts achieved for the sustainable development of megacities of the world in general and Vietnam in particular.

USMCA 2013 participants in Hanoi, Vietnam

Quick Report on Tornado Damage in Urban areas

By Dr. Makoto Fujiu

This article is a quick report on the damage stemming from tornado events due to a big cumulonimbus cloud and typhoon No. 18 on September 16th, 2013 (MAN-YI). The big tornado disasters occurred in Saitama prefecture, Japan on September 2nd and in Chiba prefecture on September 16th. According to the Japan Meteorological Agency, these tornadoes were evaluated as F2 and F1 by F-Scale, respectively. As of October 7th, 2013, the number of injured people was 67, and the number of damaged buildings was 1,529. Figure 1 shows building damage in a city block in Saitama prefecture. These houses suffered damage due to the strong wind on the roof and wall.

Figure 2 shows a totally collapsed house due to strong wind, and Figures 3 and 4 are examples of seriously damaged houses due to the tornado, which can be classified as major damage based on the building damage assessment by the local government. Figure 5 shows wall damage caused by impact from flying objects. Figure 6 shows a garbage collection site in Saitama prefecture. A lot of garbage was generated by the tornado, and the garbage collection began on the day after the disaster. Figure 7 shows the restoration of electricity poles by the electricity company. These city blocks were still blacked out the day following the disaster because many poles were destroyed by the tornado.

Figure 1 Totally collapsed house(1)

Figure 2 Totally collapsed house (2)

Figure 3 Severely damaged house (1)

Figure 4 Severely damaged house (2)

Figure 5 Wall damage

Figure 6 Garbage collection site

Figure 7 Restoration of electricity

RNUS: Rural livelihood household survey in Thailand

By Dr. Akiyuki Kawasaki

In order to clarify the structure of household livelihoods in rural agricultural areas of Thailand, we conducted an interview survey in Mae-La village, Na Khorn Luang District, Ayutthaya Province in central Thailand. This is a part of the research project "Breaking negative spiral of poverty and environmental degradation: income inequality and its environmental impacts between urban and rural areas in Southeast Asia", led by Dr. Kazuo Oki, IIS, The University of Tokyo. Researchers from Kochi University and Nagoya University also joined the survey.

We carried out interviews with 110 households. The questionnaire consisted of 14 sections for comprehending multiple aspects of household livelihoods, including demographics of household and family members, status of land ownership, farming, fishery, livestock and poultry farming, ownership of land and movable properties, savings, debts, and level of happiness.

The result of this survey will be published in an academic journal with comparative results with northeastern region of Thailand and Indonesia.

A farmer's house (left) and a snapshot of interview survey to farmers (right)

BNUS: Inspection of Ready-made Garment Factories-Training Program for Structural and Fire Auditors

By Prof. M. A. Ansary

Several building disasters have occurred recently in Bangladesh, such as the collapse of the Spectrum Garments Building in 2005, fire in Tajreen Garments Building in 2012 and more recently (April 2013) the fire at the Rana Plaza in Savar. Following the tragic incident in Savar, all concerned people including the labour community, the owners of Ready Made Garment (RMG) industries, building owners, local authorities and different government agencies became panic-stricken and immediately began to undertake a program of inspecting RMG factory buildings in order to identify the vulnerable ones.

Shaken by the colossal loss of lives of garment workers in the Savar incident, the International Labour Organization (ILO) has come forward and started communicating with the Bangladesh University of Engineering and Technology (BUET) for technical services for assessing the safety of RMG factory buildings throughout Bangladesh. The Country Director of ILO has made a formal request, and BUET agreed to conduct the training program that will be composed of the following three phases:

Phase I: Preliminary Assessment
Phase II: Use of Equipment
Phase III: Detailed Analysis

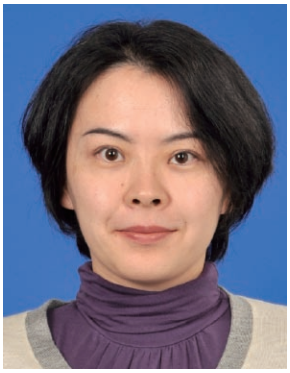
Phase I training will require 2 days – one day of desk training and one day of field training. Phase II will require 4 days of intensive hands-on training with different equipment. Phase III will also require 4 days for the development of computer modeling skills for the analysis of the inspection data.

In this report, the training on Structural and Electrical & Fire Safety Assessment for Phase I, held between August 29 and September 1, 2013 at BUET is presented. In this training program, 60 structural engineers and 70 architects, electrical and mechanical engineers were trained.

ICUS Welcomes Dr. Miho IRYO

By Prof. Kimiro Meguro

ICUS is pleased to welcome Dr. Miho Iryo as a lecturer starting November 1st, 2013. Dr. Iryo joined the Environment Informatics Division. After receiving a Dr. Eng. from the University of Tokyo, she worked at the National Institute for Land and Infrastructure Management and Nagoya University.



Her research area is traffic engineering focusing on multimodal transport in order to achieve a safe and effective road environment by efficient road space allocation and traffic control. Her works include empirical data analysis for understanding how vehicle and pedestrian movements interact with each other as well as react to spatial constraints and traffic controls. A simulation tool representing their maneuvers is being developed for assessing road designs.

We again welcome Dr. Iryo to ICUS and the Institute of Industrial Science, and are looking forward to her great contributions towards safer and sustainable urban systems.

Excellent young Researcher Award at USMCA 2013

Researcher	Title of presentation	Organization	Country
Tsubasa Sasaki	Experimental application of biogrout to sand with fines	The Univ. of Tokyo, Japan	Japan
Tomofumi Ikenaga	Assessment of multi-hazard risk in mega cities in Japan	The Univ. of Tokyo, Japan	Japan
Naoc Duyen Nguyen	The deformation of flexible pipe buried in soil with different degree of compaction	The Univ. of Tokyo, Japan	Vietnam
Nguyen Chou Lan	Scale effects on the shear strength of waste in coastal landfill sites	National University of Civil Engineering, Vietnam	Vietnam
Chunri Quan	Residual seismic capacity evaluation of RC frame with weak-beams based on energy absorption capacity	The Univ. of Tokyo, Japan	Vietnam
Seemanta Sharma Bhagabati	Comparing benefits of hydropower development in two boundary systems in the Mekong	Asian Institute of Technology, Thailand	India

ICUS Activities October – December, 2013

Date	Name	Country	City	Category	Purpose
Sep. 27- Oct. 01	Prof. Sawada	China	Shenzhen	Symposium	DEHRS2013
Oct. 07- 12	All ICUS staff	Vietnam	Hanoi	Symposium	USMCA2013
Oct. 03- Nov. 12	Dr. Kawasaki	Thailand	Bangkok		Operation of RNUS & lectures
Oct. 13- 20	Prof. Sawada	Cambodia	Phnom Penh & Kampong Cham	Investigation	Field survey in cambodia
Oct. 15- 18	Dr. Numada	USA	Los Angeles	Workshop	To attend workshop at USC
Oct. 20- 25	Dr. Kato	China	Sichuan	Lecture	International lecture on Urban Disaster Prevention Planning
Oct. 26 – Nov. 15	Prof. Sawada	Brazil		Investigation	Carbon dynamics of amozonian forest
Nov. 03- 05	Dr. Kawasaki	Myanmar	Yangon	Meeting	Visit to Yangon Technology University
Dec. 04- Jan. 17	Dr. Kawasaki	Thailand	Bangkok		Operation of RNUS & lecture
Dec. 10- 12	Dr. Kawasaki	Singapore			Visit to the National University of Singapore

USMCA2014: Nov 3-5, Yangon, Myanmar

The 13th International Symposium on New Technologies for Urban Safely of Mega Cities in Asia (USMCA2014) will be held in Yangon, Myanmar during November 3 - 5, 2014, collaborating with Yangon Technological University (YTU).

Editor's note...

The USMCA 2013 was successfully held in Hanoi, Vietnam, and we are pleased to expand our network with experts. Now Vietnam is developing very rapidly and has many construction projects for infrastructures. We could feel the atmosphere of the boom in the symposium and from people in the town. For the constructions, Japanese companies also join and contribute to their development through the latest technologies and financial support by JICA etc. We believe, furthermore, experiences of Japanese development and current situation should be transferred. The importance of maintenance of infrastructures and the consideration of risks in the city such as disasters have been recognized and studied including lessons learnt from failures. The knowledge on the urban safety should be provided through the ICUS network continuously for the establishment of sustainable urban systems.

Next USMCA will be held in Yangon Myanmar, November 2014. ICUS is now actively communicating with Yangon Technological University (YTU), providing lectures, holding seminars etc. since 2012. The latest activities will be reported in the next ICUS newsletter. Myanmar is the most promising country now in Asian region and will rapidly develop. ICUS would like to contribute to it from the beginning stage through the technology, knowledge and education. Myanmar will face the difficulties in the each stage of the development that other Asian countries have experienced. This can also be transferred by the ICUS network.

By K. Nagai

International Center for Urban Safety Engineering (ICUS)
Institute of Industrial Science, The University of Tokyo
4-6-1 Komaba, Meguro-ku, Tokyo 153-8505, Japan
Tel: (+81-3) 5452-6472, Fax: (+81-3) 5452-6476
http://icus.iis.u-tokyo.ac.jp

PRINTED MATTER

The International Center for Urban Safety Engineering (ICUS) is a research center located at the Institute of Industrial Science, The University of Tokyo.

The purpose of ICUS is to identify, investigate, and resolve issues towards the realization of sustainable urban systems for the prosperity and safety of society considering challenging socio-economic problems.