B−28 Student Tour of Japan Society of Civil Engineers (JSCE) in China

○Takamitsu MORIMOTO[1*], Akihiro NISHIYAMA[1], Chihiro KONDOU[2],
Chisei IGAWA[2], Yusuke SHINODA[3], Sachio IWAMI[3],
Toshiaki ICHINOSE[4], Tadao MIZUNO[3],
Hiroshi TSUNO[3], Masahiro MURAKAMI[1],

[1]Faculty of Engineering Department of Infrastructure Systems Engineering, Kochi University of Technology.
(Tosayamada-cho, Kochi, 782-8502, Japan)
[2]Department of Social Systems Engineering, Tottori University.
(4-101 Koyama-Minami, Tottori 680-8552 Japan)
[3]Graduate School of Department of Urban Environmental Engineering, Kyoto University.
(Fujinomori-cho 1, Fukakusa, Fushimi-ku, Kyoto City, 612-8522, Japan)
[4]National Institute for Environmental Studies.
(16-2 Onogawa, Tsukuba-City, Ibaraki, 305-8506, Japan)
* E-mail: *090494p@ugs.kochi-tech.ac.jp*

1. Intoroduction

This is a report on the 9th JSCE study tour with international symposium on the "Environmental Situation and Education in Japan and China", which has just been carried out from 4 th to 8 th March, 2008 at Shezhen City in China in a framework of the JSCE program of the sub-committee on the overseas environmwntal education in the environmental engineering committee.

There are two objectives in this JSCE study tour. The first one is to know the current situations of pollution control in environmental problems at the Shenzhen City in China. We visited six sites including sewage treatment plants, and water purification plant and solid waste treatment plant. The second is to communicate with students at the Tsinghua University to exchange views and information on the environmental ploblems in the two countries.

2. About Shenzhen City

Shenzhen City is located in the southwest of the Guangdong Province (see **Fig.1**). The population is about 8.46 million. Main industry is manufacturing including information and communication technologies. The city develops very rapidly, owing to the government's open economyt policy to assign the Shenzen city for a special economic development zone in China. The per-capita income is increasing almost as high as the level of Hong Kong and Macau.

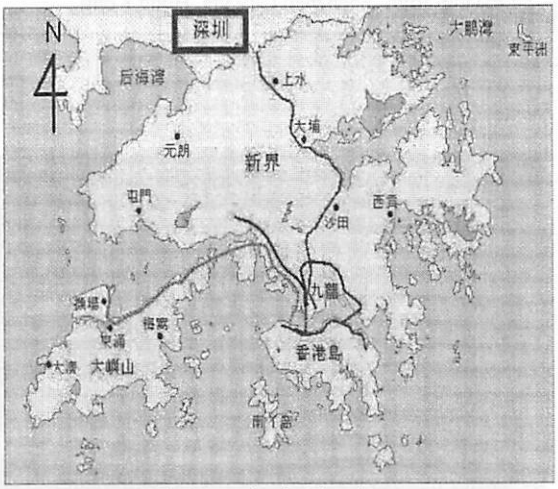

Fig.1 Location in Shenzhen

3. Outline of Tour

The economy of Shenzhen City has developed very rapidly. While, many environmental problems

came to apparent at the same time as developing the economy. Especially, water pollution of the rivers and treatment of solid wastes became serious environmental problems in the city. To solve these problems, various counter-measures are taken in Shenzhen City.The schedule of the field tour is as shown in **Table 1**, and location of the visiting project sites is as shown in **Fig.2**.

Table 1 The schedule of the tour

March,4 (Tuesday) ・Arriving at Shenzhen City
March,5 (Wednesday) ・Presentation by the JSCE students on the research topics to exchange view and information ・Presentation on the current environmental statusin China by Tsinghua University students
March,6 (Thursday) ・Visiting Honghu wetland with soil filtration treatment facility ・Visiting Mangrove Ecological Park ・Visiting Shekou Wastewater Treatment Plant
March,7 (Friday) ・Visiting Luofang Wastewater Treatment Plant ・Visiting Meilin Drinking Purification Plant ・Visiting Xiaping Landfill Site
March,8 (Saturday) ・Leaving from Shenzhen City via. Hong Kong

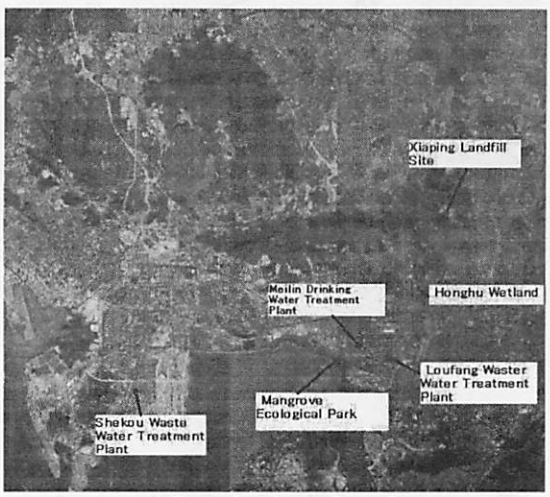

Fig.2 Location in project sites

(1) Honghu Wetland

Honghu wetland is an artificial marsh which was constructed in the Hongh park. The hydrophytes such as reed is planted in the marsh to treat waste water in the river system. The unique feature of this constructed wetland system is to irrigate the hydrophytes by pumping the river water which is highly contaminated with untreated waste water from the center of city. The constructed wetland consists of 7 units of small marsh to use them alternatively in a week. The thickness of the soil layer, which consists of sand land fill, is two meters to percolate the waste water within 6 hours. The discharge from sand filtration is about 4,000 m^3/d to remove 80 -95% of BOD, COD, T-N, T-p and SS. It is highly effective ecological treatment system to improve the water quality environment.

The filtrated water is drained into the central pond in the park. If the water quality is less than the standard level, the effluent is pumped again into another marsh with different types of hydrophytes.

(2) Mangrove Ecological Park

This park is located in the northern part of Shenzhen bay. The mangroves in the park are conserved with nature in the urban area. The mangrove swamps are unique inter-tidal wetland ecosystem occurring in sheltered tropical and sub-tropical shores with rich bio-diversity(see **Fig.3**). Futian-CityU mangrove center is a key station to either study or conserve the mangrove and its eco-system, The research work in the ecological treatment in the constructed mangrove wetland system is being carried out to evaluate the new economic value of the mangroves in the urban area.

Fig.3 Mangrove swamps

(3) Shekou Wastewater Treatment Plant

The Shekou waste water treatment plant is located in the south western part of the Shenzhen city. The waste water is treated in accordance with following steps The primary treatment unit separates solids and sands in the influent from the raw waste water. The secondary treatment unit consist of oxidation ditch, which supply oxygen by air to activate the micro-organisms. Finally, treated waste water is sent to the sedimentation tank to separate the excess sludge. After disinfection by ultra-violet rays, the treated waste water is discharged into the river system.

(4) Luofang Wastewater Treatment Plant

The Loufang wastewater treatment plant was constructed in June 28, 1998. It is one of the most important project to cope with the government's environmental *rectification* project program. The treatment capacity is 350,000 m^3 in total serving more than 650,000 people with service are of 16.5km^2 in the east of Luohu district. The treatment plant with an area of 4.53 ha was constructed into two phases. The phase 1 is designed to treat 100,000 m^3 per day of waste water. The phase 2 adopts the triple oxidation ditch system with capacity of 250,000 m^3 per day. The sludge is treated by either mechanical or centrifugal dewatering system.

(5) Meilin Drinking Water Treatment Plant

The Melin DWTP of Shenzhen Water (Group) Co., Ltd. is the largest water supply project applying the state-of –the-art technology to supply 600,000 m^3 per day of safe drinking water for the Shenzhen city. The raw water is taken from the Dongjiang river system. The main service area to supply piped water is Futian district in the Shenzhen. The treatment process consist of pre-ozonation, coagulating sedimentation, quick sand filtration, and chlorine disinfection.

(6) Xiaping Landfill Site

The Xiaping landfill site is located in the hilly mountain area of the Shenzhen city with maximum installed capacity of 50 million tons (see **Fig.4**). Controlled landfill method is applied in the process of treatment. Domestic disposals are the main source of landfill to treat 3,500 – 4,000 tons per day. Construction wastes are not included in the project. While, the methane gas in the landfill is collected through pipe network system to supply 2,000Nm^3 per hour of gas fuel for automobiles in the project. The price of the methane gas is about 60% of the gasoline.

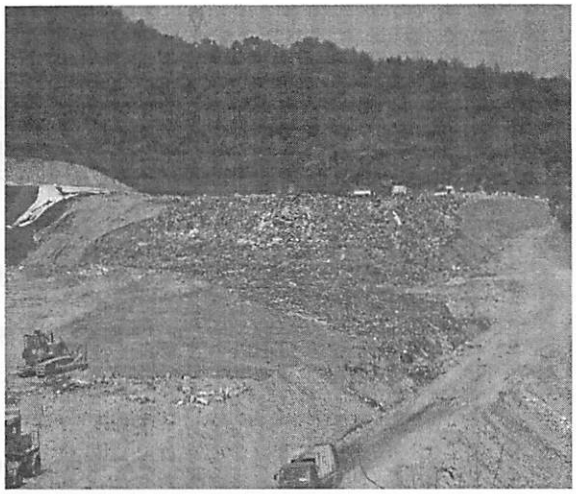

Fig.4 Xiaping landfill site

4. Concluding Remarks

It was exclusively good opportunity to lean the current status of environmental problems in urban development at Shenzen city in China, by exchanging view and information with students and professors in the Tsinghua university and government engineers at Shenzen. Many thanks for their kind attention and cooperation with guidance. We look forward to seeing them again after stdying environmental engineering more in depth.

REFERENCES

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http://english.sz.gov.cn/

2) EXPLORE SHENZHEN
http://sz.explore.ne.jp/