B−58 12th JSCE (Japan Society of Civil Engineering) Student Study Tour on the Environmental Problems in Vietnam

○Yui Miyagawa[1*], Tppei Natori[2] Hidenori Harada[3], Nguyen Pham Hong Lien[3], Shinya Echigo[3], Shigeo Fujii[3], Murakami Masahiro[1], Masashi Iijima[4]

[1]Kochi University of Technology
(Miyanoguchi 185 Tosayamada-tyou Kami-shi Kochi 782-8502, Japan)
[2]Kisarazu National College of Technology
(2-11-1 Kiyomidaihigashi Kisaradu-shi, Chiba 292-0041, Japan)
[3]Graduate School of Global Environmental Studies, Kyoto University
(Yoshidahonmati Sakyou-ku Kyoto-shi, Kyoto 606-8501,Japan)
[4]A member of JSCE
[*]E-mail: *140276j@ugs.kochi-tech.ac.jp*

1. Introduction

This paper is a report of the 12th JSCE (Japan Society of Civil Engineering) Student Study Tour on Vietnam, which has been held from the 3rd to the 9th of March 2011, to understand the current status of water environmental problems in Southeast Asia in collaboration with the Kyoto University EML (Environment Management Leader) program (Table 1). The purpose of this tour is to find new possibilities of international academic exchange program and technical cooperation with Vietnamese students and academics through the lessons to be learnt from the recent problematic history of Japan's rapid economical growth in 1960s-1970s including the serious case of Minamata disease. This report includes our field excursion including the visit of water purification plant in Hue and landfill sites with leachate treatment facilities in Hue and Hanoi.

Table 1. The outline of the tour.

4, March	Visit Hue University of Science Engineering Site Visit (Water purification plant at Quang Te 2, The Thuy Phuong treatment facility),Student exchange (Hue University of Science and Japanese students)
5, March	3rd EML Symposium
6, March	Field Trip Visit historical sites Move to Hanoi
7, March	Hanoi University of Science and Technology Workshop
8, March	Nam Son Site Visit Kim Lien Site Visit

2. Water purification plant at Quang Te 2 in Hue city

Hue city is an ancient capital of the Hue dynasty, and now is a world heritage of UNESCO. The city operates three water purification plants with the total capacity of 114,500 m^3 /day. The coverage of the water supply system is 99% while the daily consumption of tap water is 120 to 130 L/person, which is almost the half of the daily water consumption of Japan.[1 and 4)]

The Quang Te 2 water purification plant (Fig.1) directly take source water from the Huong River. The source water from the river was highly turbid before sand filtration. After the filtration, the quality of water was greatly improved, and no color and odor was observed (Fig. 2) The purified water meets the WHO water quality guidelines, and is safe to drink. Also, we learned that the water in distribution system in some areas is contaminated with groundwater by poor maintenance of pipeline. This is a typical problem in many developing countries in the world.

Other problems we identified are as follows: (1) some water storage tank was not covered (i.e., contamination after treatment may occur); (2) poor management and security of the laboratory in treatment plants.[2)]

The coverage of water supply in the suburb of the Hue city is estimated to be less than 50%, owing to the financial and management problems (i.e., high cost for long main pipes for scattered small population). The water supply in rural areas is the world common problem. Other options including decentralized water

supply systems through international cooperation have to be considered.

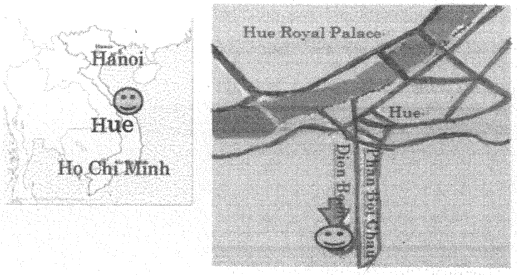

Fig.1 The location of Quang Te 2 treatment plant

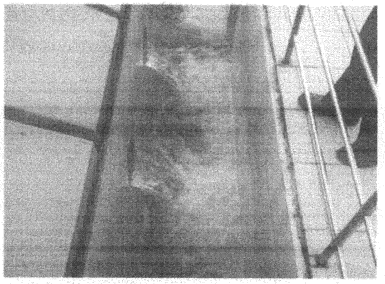

Fig.2 The water storage tank

3. Municipal solid waste treatment facility and the leachate control in Hue and Hanoi city

Hue city collects 190 t/d of raw solid wastes. 90% of the waste is recycled in weekdays, while the rest (i.e., 10%) is directly sent to a landfill in weekend. The Thuy Phuong treatment facility (Fig. 3) adopts the sanitary controlled landfill system to control the leachate. The compost factory in the landfill site collects organic waste in the solid waste by hand to recycle it as an organic fertilizer.

The organic solid waste after the separation by hand is not completely safe. This may pose health risks to workers in the compost factory (Fig.4).[3] Also, secondary pollution by reusing the organic compost from this plant needs to be addressed.

The Nam Son solid waste treatment facility in Hanoi city (Figs. 3 and 6) collects 3,000 t/d of the raw solid waste. The solid waste is ultimately sent to a landfill site without any incineration process to recover methane gas. The infiltration of rainwater in the open landfill system causes the transfer of harmful substances including heavy metals to the river system. The leachate is treated by the Fenton reaction. However, the purified leachate has brown color and is not completely safe. In order to solve the problem, it is essential to establish a better system to control and manage leachate quality.[5]

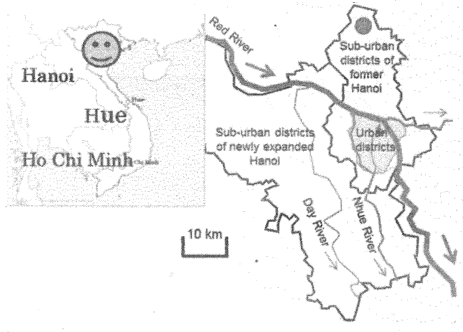

Fig.3 The location of Nam Son Landfill site in Hanoi

Fig.4 The worker in the compost factory at the Thuy Phuong treatment facility

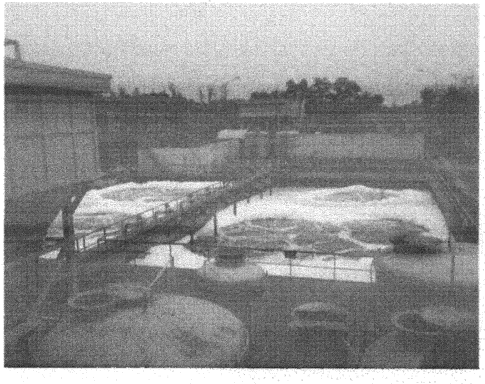

Fig.5 The leachate treatment facility

Fig.6 Nam Son solid waste treatment facility

4. Concluding Remarks

It was a very good opportunity to learn the current status and problems of environmental infrastructure development at Hue and Hanoi cities in Vietnam, by exchanging view and information with students, academics and professors in Hue and Hanoi. Recently, the rapid economic growth in Southeast Asia has created a wide range of concerns in environmental pollution. To minimize environmental pollution in this area, the partnership between developed and developing countries is essential. Though it was a short trip, we could achieve mutual understanding on environmental issues and cultural difference through presentations and discussion. . We believe that this tour was a great success overall. We look forward to seeing them again after studying environmental engineering more in depth in Japan and Vietnam

.

5. Acknowledgement

We would like to appreciate the kind support by the project members of the Kyoto University EML (Environment Management Leader) program sponsored by JST.

References

1) The Ministry of Land, Infrastructure and Transport: "Japan's Water Resources 2005" ,(in Japanese)
2) http://www.jica.go.jp/publication/monthly/0711/03.html (3/27):[Vietnam's water resources]
3) World Bank (2004) : Recycled resources -use " efficiency in Vietnam", in Japanese
4) http://waquac.net/english/pdf/newsletter200906_en.pdf WaQuAC-NET Newsletter No.3 June 2009 :[Vietnam's water resources]
5) csp.eworlding.com/3r/congress/manu_pdf/44.pdf (5/25):[Solid waste management in Hanoi city, its problems and solutions]