

## N-1 16<sup>th</sup> Japan Society of Civil Engineering Study Tour: Environmental Problems in Kathmandu, Nepal

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### 1. INTRODUCTION

This report regarding the 16<sup>th</sup> Japan Society of Civil Engineering (JSCE) Study Tour examined environmental problems in Kathmandu, Nepal. This tour was designed to examine environmental problems in developing countries and facilitate the exchange of opinions among researchers, government officers, and participants. This tour was run in collaboration with the East Asia Environmental Strategist Training Program of Kyushu University Research Institute for East Asia Environments and was held from March 1–7, 2015.

Kathmandu, the capital of Nepal, is a city in the Kathmandu Valley. There are many temples and seven World Heritage Sites in Kathmandu. This city is facing problems that have been caused by its rapid economic and population growth, including illegal dumping in riverbeds, water pollution, a shortage of drinking water, and traffic jams.

The purpose of this tour was to improve our understanding of environmental problems in Kathmandu and to develop a relationship between Japan and Nepal by inspection of environmental conditions and facilities in Kathmandu, discussions with students at Tribhuvan University, and exposure to Nepalese culture.

This report describes our field work involving visits to a wastewater treatment plant, solid waste transfer station, and World Heritage Sites.

Seven students and five faculty members from three universities participated in this 7-day tour. The itinerary is shown in Table 1.

Table 1. Tour itinerary

March 1	Introduction and welcome party in Thamel
March 2	Lectures at Tribhuvan University Visits the Guheshwori wastewater treatment plant and Patan and Kathmandu Durbar Square World Heritage Sites
March 3	Workshop on student research projects and first impressions about environmental problems in Kathmandu involving students from Japan and Tribhuvan University Visits to the Teku solid waste transfer station and Kirtipur and Swayambhunath World Heritage Sites
March 4	Discussion of and presentation on environmental problems in Kathmandu and countermeasures with Tribhuvan University students Visit to a residential area Wrap-up party with Tribhuvan University students
March 5	Visits to a brick factory, Nagarkot and the Bhaktapur Durbar Square and Changu Narayan World Heritage Sites
March 6	Visit to the Pashupati Nath World Heritage Site
March 7	Stroll around Kathmandu Durbar Square with Tribhuvan University students

## 2. ENVIRONMENTAL FACILITIES VISIT

### (1) Guheshwori wastewater treatment plant

There are five wastewater treatment plants in the Kathmandu Valley, but four plants are not working because of construction problems, high costs, and other factors. The Guheshwori wastewater treatment plant is functional and has a capacity of 164,000 m<sup>3</sup>/day. It operates using the oxidation ditch process (Picture 1). Its capacity equals the amount of wastewater discharged by 200,000 people, although the population of the Kathmandu Valley (Kathmandu, Lalitpur, and Bhaktapur) is 2,517,000.<sup>1)</sup> Consequently, most wastewater is discharged into the river without any treatment.



Picture 1: Guheshwori waste water treatment plant

### (2) Teku solid waste transfer station

In the Kathmandu Valley, approximately 75% of the solid waste is organic,<sup>2)</sup> and most of it is landfilled without incineration. Solid waste from the Kathmandu Valley is collected and temporarily transferred to the Teku transfer station, because the landfill site is far from the urban area. When we visited Kathmandu, the Teku solid transfer station had stopped receiving solid waste, because the landfill site had been closed for a short period. As a result, the solid waste collecting system was not performing adequately, and garbage was scattered throughout the city (Picture 2).

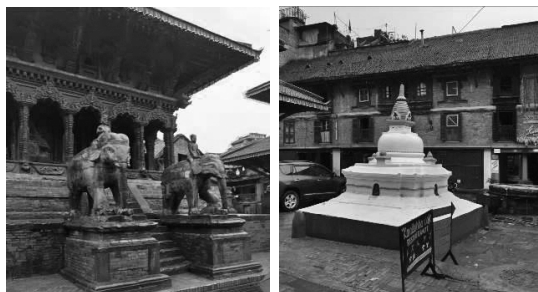


Picture 2: Teku solid waste transfer station (left)  
Household waste on a road in Patan (right)

## 3. WORLD HERITAGE SITE VISITS

### (1) Patan Durbar Square<sup>3)</sup>

Patan is the oldest city in the Kathmandu Valley. The monuments, temples, chowks, and royal buildings around Patan Durbar Square were built over hundreds of years by thousands of people during the reigns of various kings in the Malla dynasty (Picture 3).



Picture 3: Patan Durbar Square

### (2) Kathmandu Durbar Square<sup>4)</sup>

Most of the buildings were constructed in the 15<sup>th</sup> to 18<sup>th</sup> centuries during the Malla and Shah dynasties (Picture 4). Kumari, a holy girl who has not reached menarche, lives in the Kumari Ghar temple located in Kathmandu Durbar Square. She appears at a window once a day; fortunately, this happened during our visit.



Picture 4: Kathmandu Durbar Square

### (3) Swayambhunath

The largest stupa in Nepal is on top of Swayambhunath. A stupa is a dome-shaped Buddhist monument. Many monkeys played freely around the stupa (Picture 5).



Picture 5: Swayambhunath

#### (4) Bhaktapur Durbar Square<sup>3)</sup>

Most of the monuments around Bhaktapur Durbar Square were constructed in the 17<sup>th</sup> and 18<sup>th</sup> centuries during the Malla dynasty. Bhaktapur Durbar Square was the calmest and most extensive of the three Durbar Squares (Picture 6).



Picture 6: Bhaktapur Durbar Square

#### (5) Changu Narayan<sup>3,5)</sup>

The buildings of Changu Narayan are on top of a hill 20 km from Kathmandu. Holi, which is often referred to as the “festival of Colors”, was held when we visited Changu Narayan. Citizens throw water balloons at each other and paint each other’s faces (Picture 7).



Picture 7: Holi in Changu Narayan

#### (6) Pashupati Nath<sup>3)</sup>

There are many temples on both sides of the holy Bagmati River. These are the most revered Hindu temples and only Hindus are allowed to enter them. Hindus are cremated beside the Bagmati River, in the presence of tourists. The ashes are dumped into the Bagmati River (Picture 8).



Picture 8: Pashupati Nath

## 4. CONCLUSIONS

This tour was a great opportunity to understand the current status of and problems in Nepal, investigate countermeasures for these problems, interact with citizens and students of both countries, and be exposed to Nepalese culture. The tour was interesting and enjoyable. Unfortunately, many of the buildings that we visited collapsed during an earthquake on April 25, 2015 and a great number of people were killed. We are grateful to the Nepalese and pray for the souls of the dead.

## ACKNOWLEDGMENTS

This tour was supported by the Japan Society of Civil Engineering, East Asia Environmental Strategist Training Program of Kyushu University Research Institute for East Asia Environments, Tribhuvan University, Kathmandu University and UN HABITAT. We gratefully acknowledge the contributions of these partners.

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