CASE STUDY OF GIS TECHNOLOGY TRANSFER AND TRAINING IN CAMBODIA FOR RECONSTRUCTION ASSISTANCE AND FRIENDSHIP WITH JAPAN

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ABSTRACT

GIS technology is very important technology of that associates a lot of information on the base map. It is used in a great many fields such as agriculture, agricultural civil construction, road construction / maintenance / management, city planning, and environmental preservation. etc.. GIS is also used in reconstruction assistance projects of Cambodia at JICA from Japan. For practical use GIS technology to the Reconstruction Assistance of Cambodia, we established the Meiho Engineering's branch office in Phnom Penh, Cambodia. We had planned to create employment and training by OJT (On Job Training) for numerical mapping and spatial data editing of GIS technology. At the support, we had three purposes. 1. Transfer GIS technology to Cambodia. 2. Create a GIS job in Cambodia. 3.Sharing to Cambodia, to reduce the workload of Japanese engineers. We made the specifications of the spatial data editing to be created and the materials for the specific creation method, at PDCA-cycle. P: Instruction of editing, D: Editing, C: Check and Instruction of correction from Japan, A: Correction and Confirm. Move to the next new phase. Accumulating with in this PDCA-cycle, the entire editing work had come to rotate, and burden on engineers could be reduced, work efficiency had improved. We will continue to create employment for GIS engineers and improvement of GIS technology through branch in Cambodia. In order to, we will continuously carry out editing work at OJT, and we will support the development of friendly relations between Japan

KEY WORDS: GIS technical support, ArcGis, Employment creation, OJT (On Job Training), JICA Cambodia

1.INTRODUCTION

Our company has GIS technology and many achievements in Japan. Effective planning of reconstruction plans and efficient operational planning are important. We believe the GIS technology is one of the very important tools to do that. We are cooperating with Cambodia's reconstruction assistance with this technology.

We devise the way to facilitate remote instruction and understanding, considering of technical skills and differences from Japanese culture. We make the four phases method for the spatial data editing, in Japan. We create it in four parts, such as the space data conversion, with the following flow for each phase, at PDCA-cycle. P: Instruction of editing contents at Japan ⟶ D: Editing work in Cambodia ⟶ C: Check and Instruction of correction from Japan ⟶ A: Correction and Confirm in Cambodia. Move to the next new phase. By the experiences of these simple method, the entire editing work has come to rotate.

2.Start OJT (ON JOB TRAINING)

We established the Phnom Penh branch in Cambodia, and started the GIS business. We have got the project to create a new map, from JICA. JICA is very big Japanese aid organization. We teach Cambodian employees (as technical staffs. After abbreviated as staffs), and include Cambodian leader, GIS technology, directly at OJT, in this job, by Japanese engineer at assigned to the branch.

1)The work is the following contents and procedure.

The area of approximately 150 km2(Figure 1). Purchase the latest satellite images and draw features, drawing range 450km2, satellite image created by GeoEye (Figure 2), drawing created at 1/5000, use software in map360.

Figure 1

Set the control points that serves as the reference for the drawing and determine the coordinates by GPS observation. (Figure 3,4)
Correct and complete the drawing with coordinates. (Figure 5)
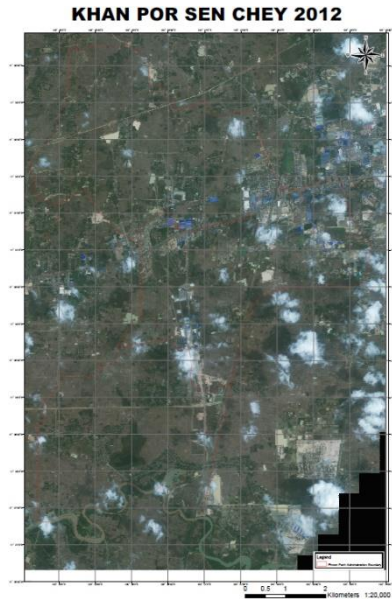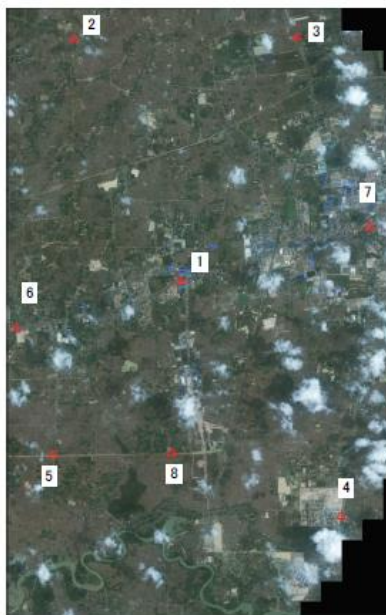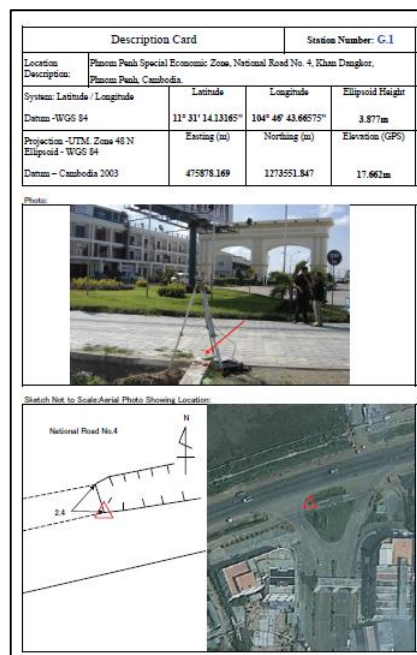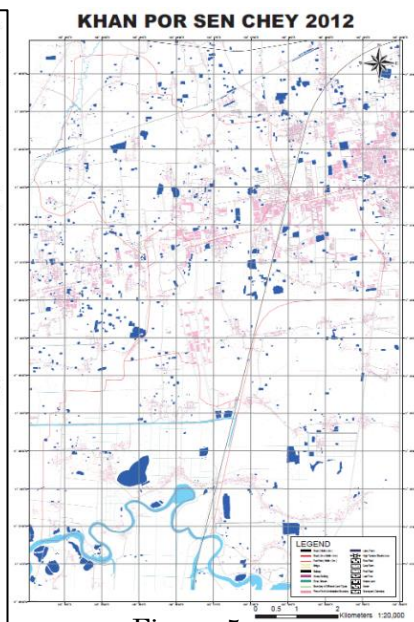

Figure 2

Figure 3

Figure 4

Figure 5

2) We have announced the effectiveness of GIS to the Cambodian government at the workshop hosted by JICA. (Figure 6)

Figure 6

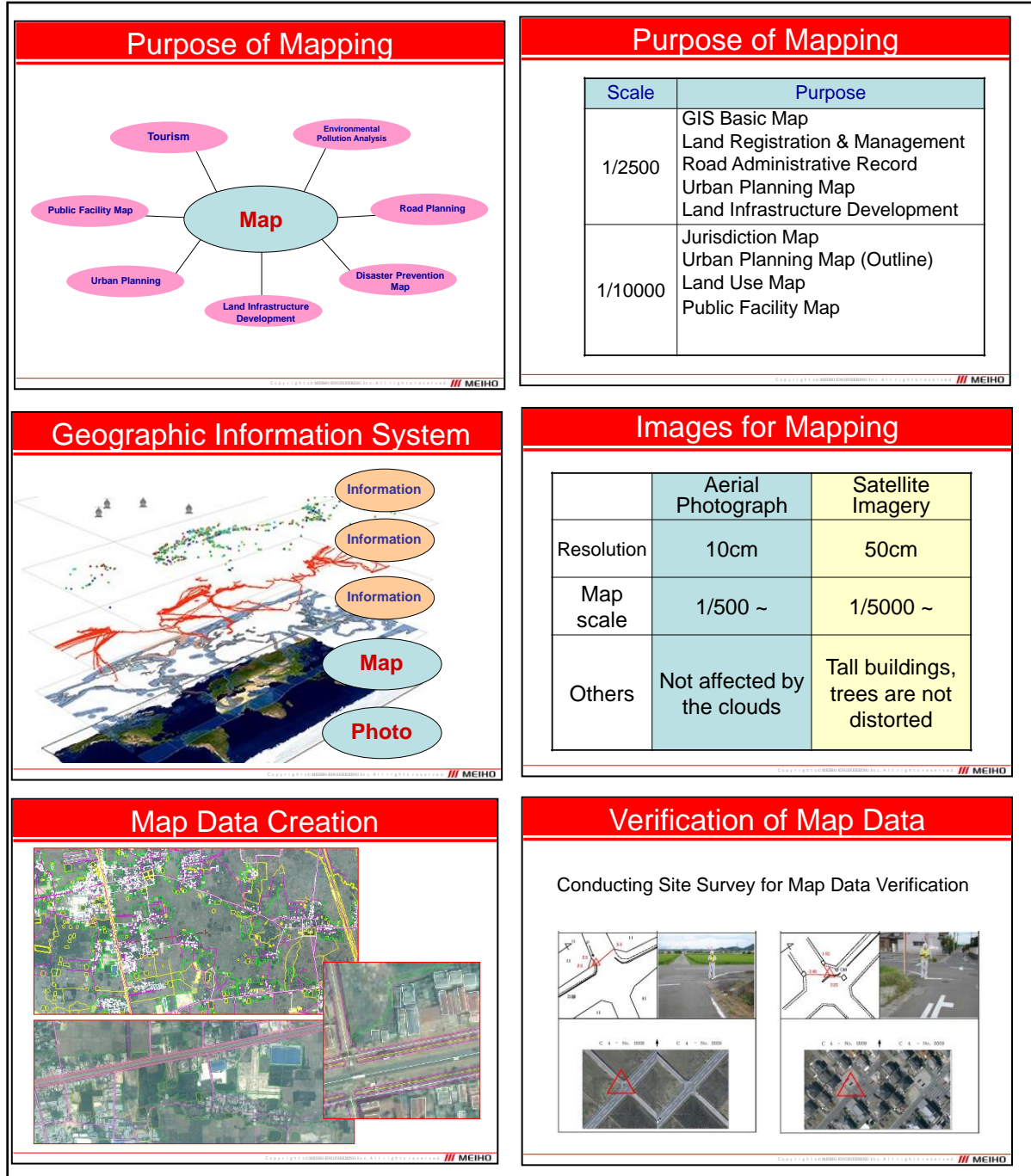The main announcements are as follows (Figure 7).

Figure 7

We explain GIS Map. It has many Purposes available. Map scale and Purpose of use. Many Information on the map. Map scale, accuracy and features. Example of Map Data Creation. Example of accuracy confirmation method (Figure 7).

3) Cambodia School Mapping project by JICA

We have created Cambodia School Mapping (Client: JICA / MOEYS) and make the lecture to the Cambodian Board of Education to understand GIS and disseminate technology.

In the Cambodia School Mapping (Figure 8,9) and Data System Development ordered by JICA.
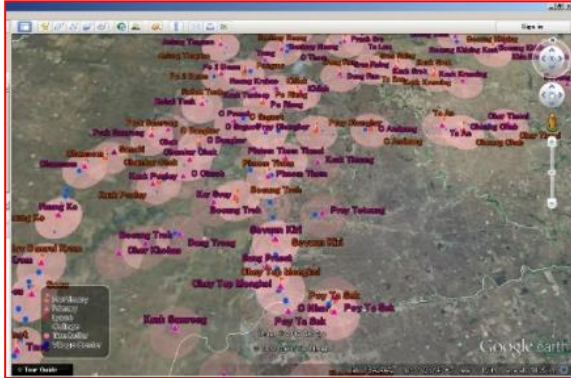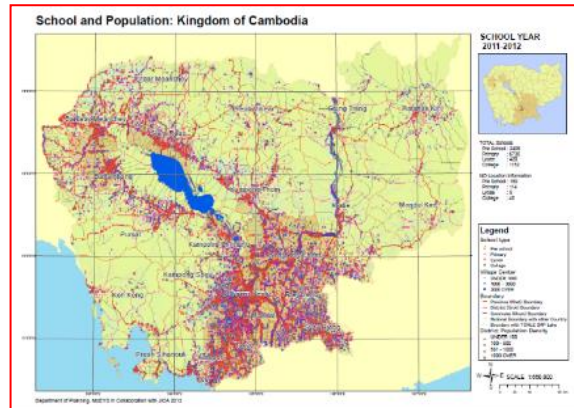

Figure 8

Figure 9

Figure 10

We also gave a lecture on how to use GIS to those involved in MAP creation and user education (Figure 10).

4) OJT in these projects to improve GIS technology

We have implemented OJT on these projects. Educated Cambodian staffs on GIS knowledge, training on make mapping technology and knowledge, skills, training on how to use ArcGis, and to take training experience to earn many GIS skills.

Not only OJT, but also, we could understand the technical capabilities and individuality of the leader of Cambodian staffs. Together with the leader, we have devised the method to ensure and easily understanding the instructions by remote instruction.

3.Start of remote instruction OJT (ON JOB TRAINING)

1) The case of spatial data editing

The case of spatial data editing, the Japanese side create materials on the specifications of the spatial data to be created and the specific creation method.

We create it in four parts, such as shared space data conversion, and proceeded step by step with the following steps. Next, at the beginning of the work, we instruct the general leader (fluent in Japanese) through the web conference.

We have management by PDCA cycle, follows.

P: Instruction of editing contents (Japan) → D: Editing work (Cambodia) → C: Check with Meiho (Japan) (Figure 11) → Correction instruction (Japan) → A: Correction (Cambodia) → Confirm Meiho (Japan) (Figure 12) → Move to the next map job (Japan)

For Example: Correction work, Correct the map by changing the current situation

Figure 11

Figure 12

The challenge of this process, there are many phases of technical judgment and work at Japan. We make huge amount of setup such as checking work and data organization for the next phase. Therefore, Japanese engineers have very heavy burden of processing.

At continuing this process for several years. The leader and staffs in Cambodia branch are able to accumulate and learn error patterns. The general leader has improved technological strength, and enabling correct technical decisions.

Therefore, not only the number of queries about technical guidance to Japan has decreased, and but also the labor burden on Japanese engineers has reduced.

2) The case of 3D filtering

The work of removing various features (structures such as buildings and bridges, vegetation such as trees) data contained in the three-dimensional coordinate digital data obtained by aerial laser measurement and extracting only the ground surface data is called filtering work.

Stages 1st: Automatic filtering
Automatic processing for removal of obvious noise such as multiple reflections in atmospheric clouds, water vapor, airplanes, birds, and buildings in addition to feature data (Japan) (Figure 13).
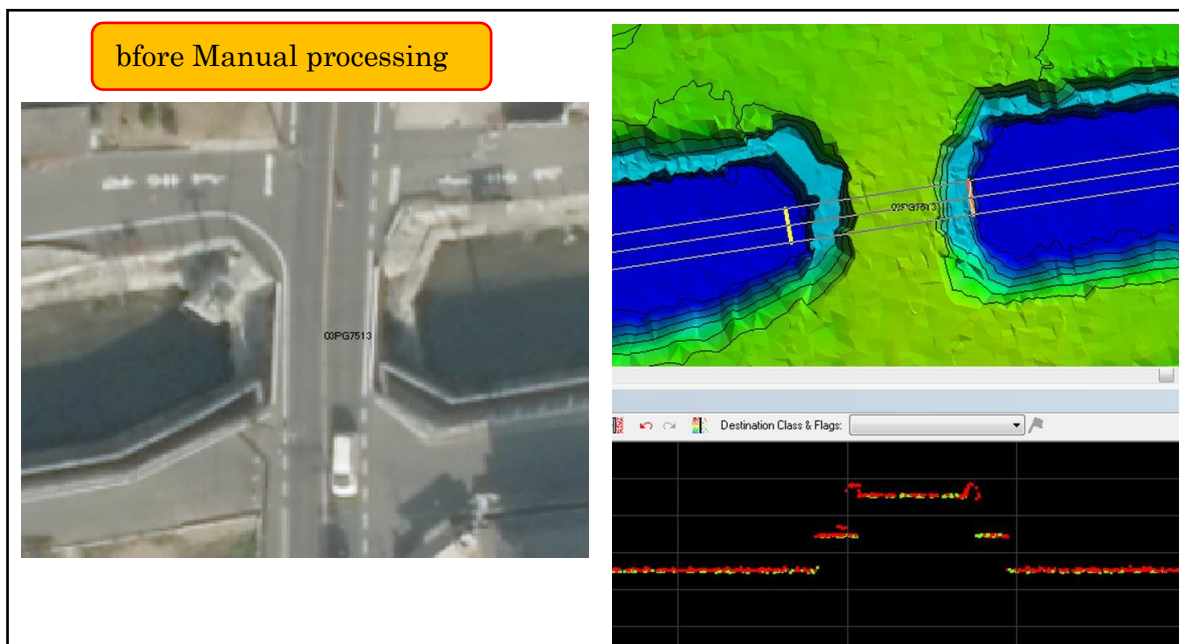

Figure 13

Stages 2nd: Manual filtering

Removal of residual noise by automatic filtering.

Check (inspection): Collate the processing results using contour maps and orthophoto images.

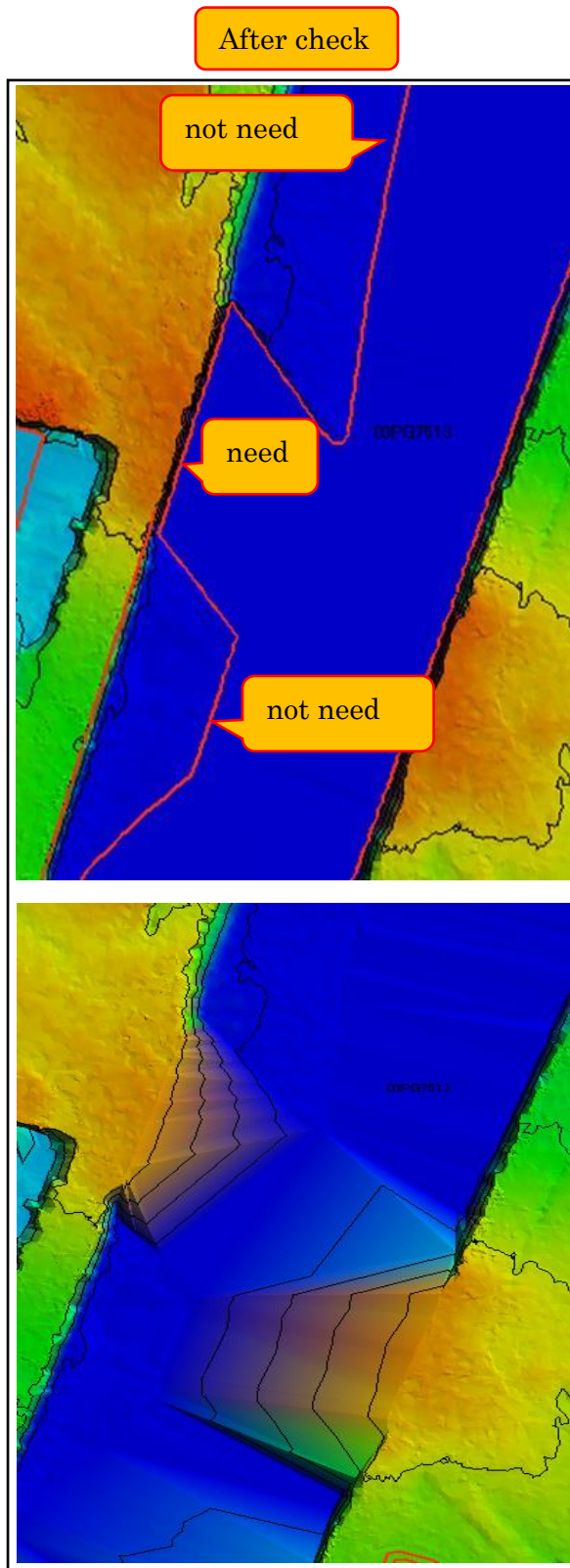This manual filtering and checking (inspection) work has processed at the Cambodia branch.
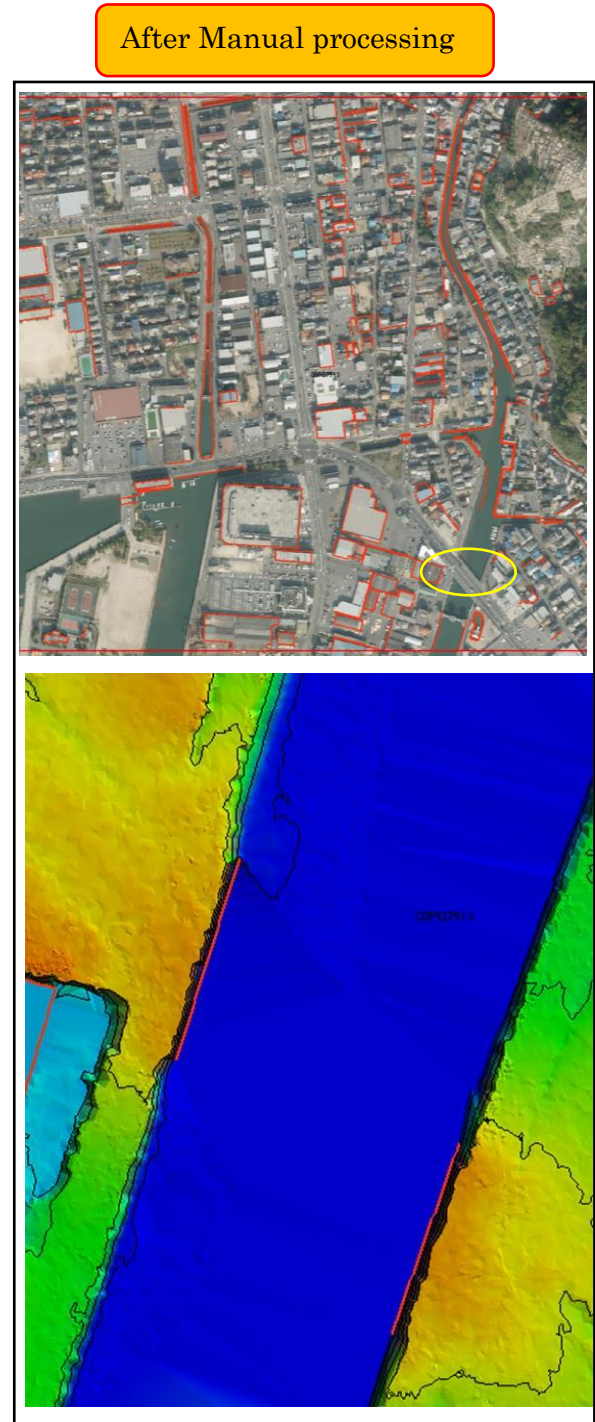
After check

After Manual processing

Figure 15

Figure 14

We have management by PDCA cycle, follows

P: We make the work instructions from Japan.

D: The leader instructs the staff in charge of work. (Cambodia)

→After work by the staff, the leader checks and corrects if necessary (Cambodia) (Figure 14)

→Send completed data from Cambodia branch to head office (Japan)

C: Check at the head office (Japan) (Figure 15)

   A: Next move to the new map job (Japan)

 If there are corrections. D: To correct at the Cambodia branch

3) Result of these our method

   In these accumulating simple works, we have earn the entire editing work can be completed, reducing the burden on staffs. And we have to make few work tasks for each phase, and to check for each phase, not only improving work efficiency, but also, we have aimed to improve quality.

   We will continue to cooperate in technical support and improvement of GIS technology through staffs who have acquired the technology in our company. We will continue to carry out editorial work at OJT to create and maintain technician jobs.

   We will continue to support the development of friendly relations between Japan and Cambodia by continuing our technical assistance.

4. CONCLUSIONS

  As conclusions, we show our Company Profile follows.

  Our Company Rationale is declared in our management philosophy with Kei-Ten-Ai-Jin.

Company Profile (Figure 16), Management Rationale (Figure 17), Corporate Motto
(Figure 18), Our Service (Figure 19), Completed Project (Figure 20,21)

Figure 16

Figure 17

Figure 18

Figure 19

Figure 20

Figure 21

Based on this philosophy, we have operated in Japan, but also in Cambodia.

We have the plan to expand the corporate development, based on this philosophy to Southeast Asia.

We have ready to welcome the company that understanding, sympathizing, and deeply resonate with our company philosophy.

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