The Seamless Cadastral Mapping with Computerized Digital Files in Korea

- Focusing on the ASCM (Accurate Seamless Cadastral Map) -

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1. Cadastral Map before

- 1910 : Registered by Land Title Project

- Registered by Graphical Surveying Map

- Sheet by Sheet

- Plan Table Surveying

- Expanded, Shrinked, Worn Down, distorted

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2. Computerization Project of the Cadastral Map

- The Purpose of Project
  - Facilitate maintenance and management of the cadastral map
  - Building a highly accurate database available for the cadastral survey
  - Be able to be a base map of the NGIS (National Geographic Information System)

- 2003 : Completed

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3. New Cadastral map

- 2003 : Mapping by Computerization Project of the Cadastral Map

- Made by computerized digital file

- Electronic Plane Table (Total Station + Pen computer) Surveying

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4. Problem & Solution

- Problem
  - While building the cadastre database.
  - Mismatched drawing
  - Not good results Caused inconvenience to surveyors in providing the survey results

- Solution
  - Accurate Seamless Cadastral mapping
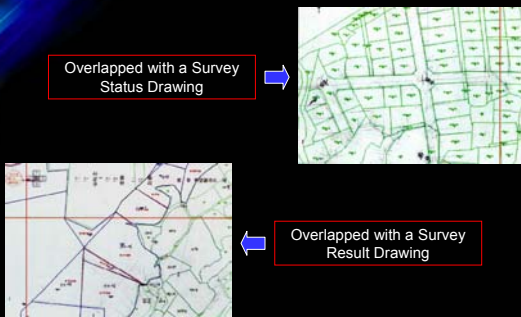 - Use of the computerized digital file

II. Type of the Seamless Cadastral Map

- Through the computerized cadastral drawings

- The diagram database shall be used the PBLIS (Parcel Based Land Information System) in the MOGAHA (Ministry of Government Administration and Home Affairs)

- Accurate seamless Cadastral Map
  - MOGAHA
  - For the purpose of the cadastral administration and survey

- Seamless Cadastral Map
  - MOCT (Ministry of Construction and Transportation)
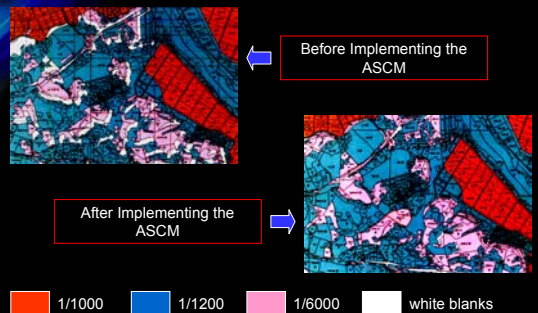 - In order to provide the policy information.

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1. Case study : Use of the Scanned Images

- Types of the scanned images
  - Survey result drawings, i. e. processed drawings
  - Survey status drawings, i. e. as-made in field work , not processed

- The Seamless Cadastral Mapping Program should be used

- How to use the scanned images
  - Computerized digital file is overlapped with an image data kept in the Seamless Cadastral Mapping Program.

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1. Case study : Use of the Scanned Images

Overlapped with a Survey Status Drawing

Overlapped with a Survey Result Drawing

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1. Case study : Use of the Scanned Images

Before Implementing the ASCM

After Implementing the ASCM

1/1000　　1/1200　　1/6000　　white blanks
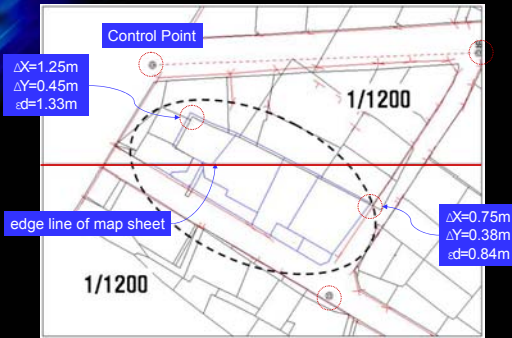
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2. Case study : Field survey

- Selection of the work and discussion of survey
  - Firstly, making a decision whether survey would be necessary or not
  - Secondly, matching the drawings at the office using Seamless Cadastral Mapping Program before the field work
  - Thirdly, evaluating the matching precision,
  - Fourthly, when necessary, field survey should be carried out
  - After implementing the field survey
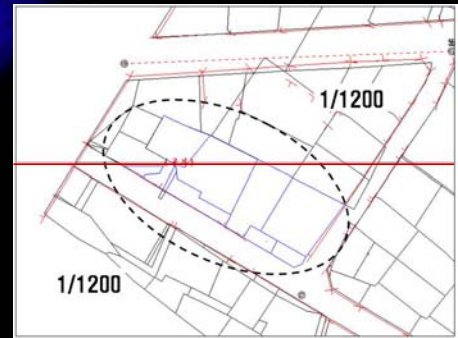   - Determining a solution with a staff of the competent authorities

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2. Case study : Field survey

- Procedures for the matched drawing
  - KCSC software (Total Survey System) and electronic plane table surveying
  - On the basis of field boundaries to unit of block
  - Unit of block : roads, ditches, rivers
  - The fixed point : edge of map sheet
  - Applied to all locations

2. Case study : Field survey

Control Point

$\Delta X=1.25m$
$\Delta Y=0.45m$
$\varepsilon d=1.33m$

1/1200

edge line of map sheet

$\Delta X=0.75m$
$\Delta Y=0.38m$
$\varepsilon d=0.84m$

1/1200

2. Case study : Field survey

1/1200

1/1200

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1. Criteria for matched drawing

- Article 54 of the Enforcement regulations of the Cadastral Act (The Determination of the Survey Results)
  – Where boundary points are coordinated : 0.10 m
  – The rest : 0.3×M mm (M = Scale Denominator)

- For examples
  – Map Scale 1/1200 : 0.3×1200 = 360 mm
  – Map Scale 1/600 : 0.3×600 = 180 mm
    → 180 mm, field surveying required

2. Matching Principles

- Basic Principles
  – The fixed point of the matched drawing is an edge of map sheet
  – To minimize the change in shape and area of the parcel during matched drawing
  – If the parcel boundaries require the field survey, we could conduct the matched drawing based on the survey results, including the survey result drawing and the images

- General Principles
  – Private land, small area, large scale
  – Closed polygonal parcel

V. Conclusions

- When the field surveys are introduced in the matched drawing, the field boundaries and the map boundaries are overlapped together referred to unit of block such as roads, ditches, rivers

- In order to the required accuracy in the matched drawing
  - Criteria for matched drawing should be applied
  - Edge of map sheet as the fixed point is reasonable to be accepted.

- It is expected that an scanned image data of paper map can contribute to an early completion of the ASCM by diminishing the need to carry out the field survey, because the KCSC has retained 5,600,000 survey result drawings from 1994 to 2005.

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Thank you for your attention!