



# Work Improvement by CALS/EC

Kazushige Endo

National Institute for Land and  
Infrastructure Management, MLIT

# OUTLINE

About CALS/EC

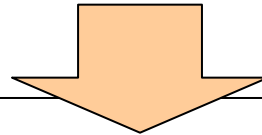
Work Improvement by CALS/EC

CALS/EC Action Program 2008

## Purposes of CALS/EC

### Concept of CALS/EC

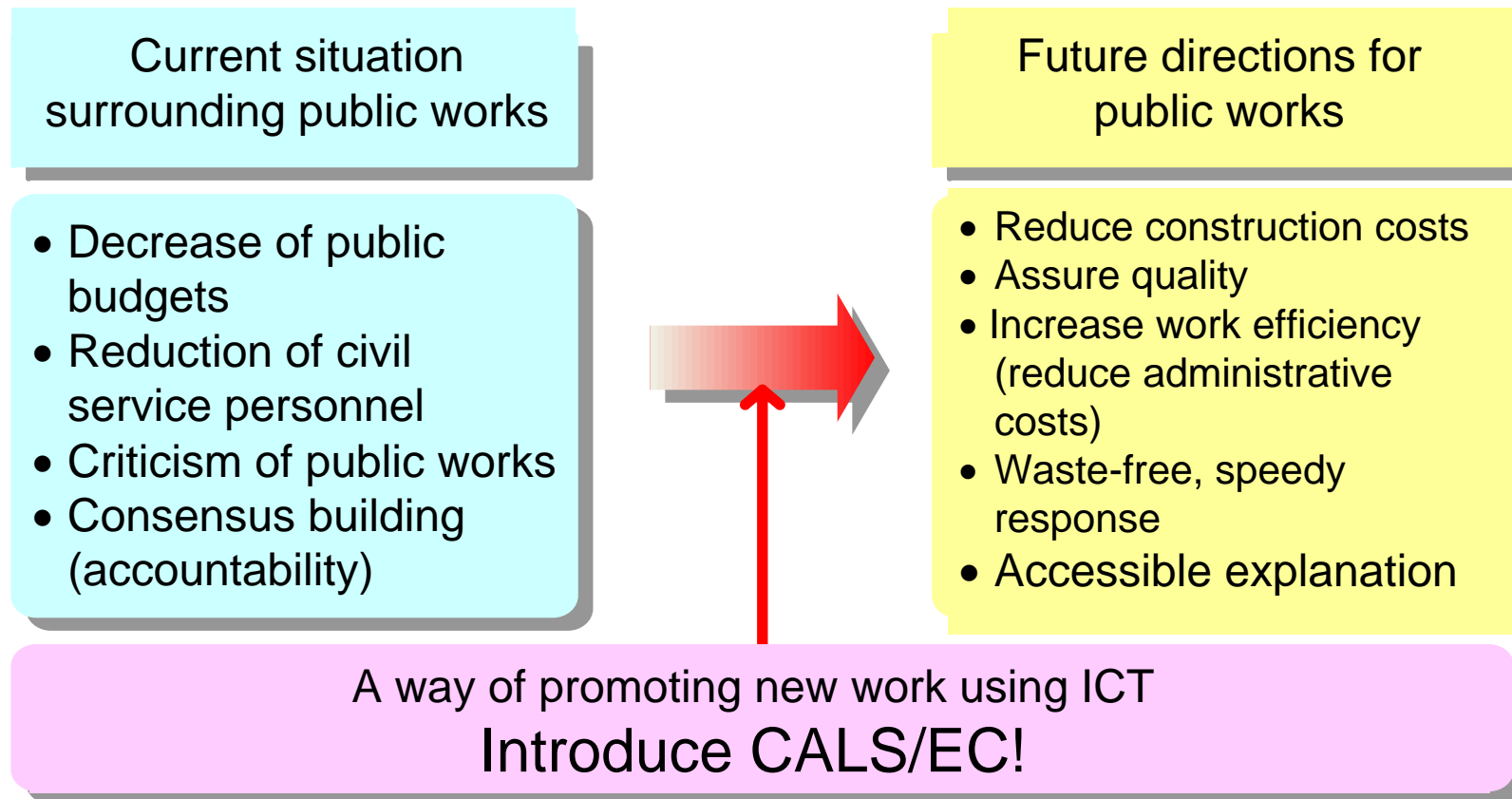
- Electronic use of information through standardization
- Exchange and sharing electronic information
- Use of IT networks



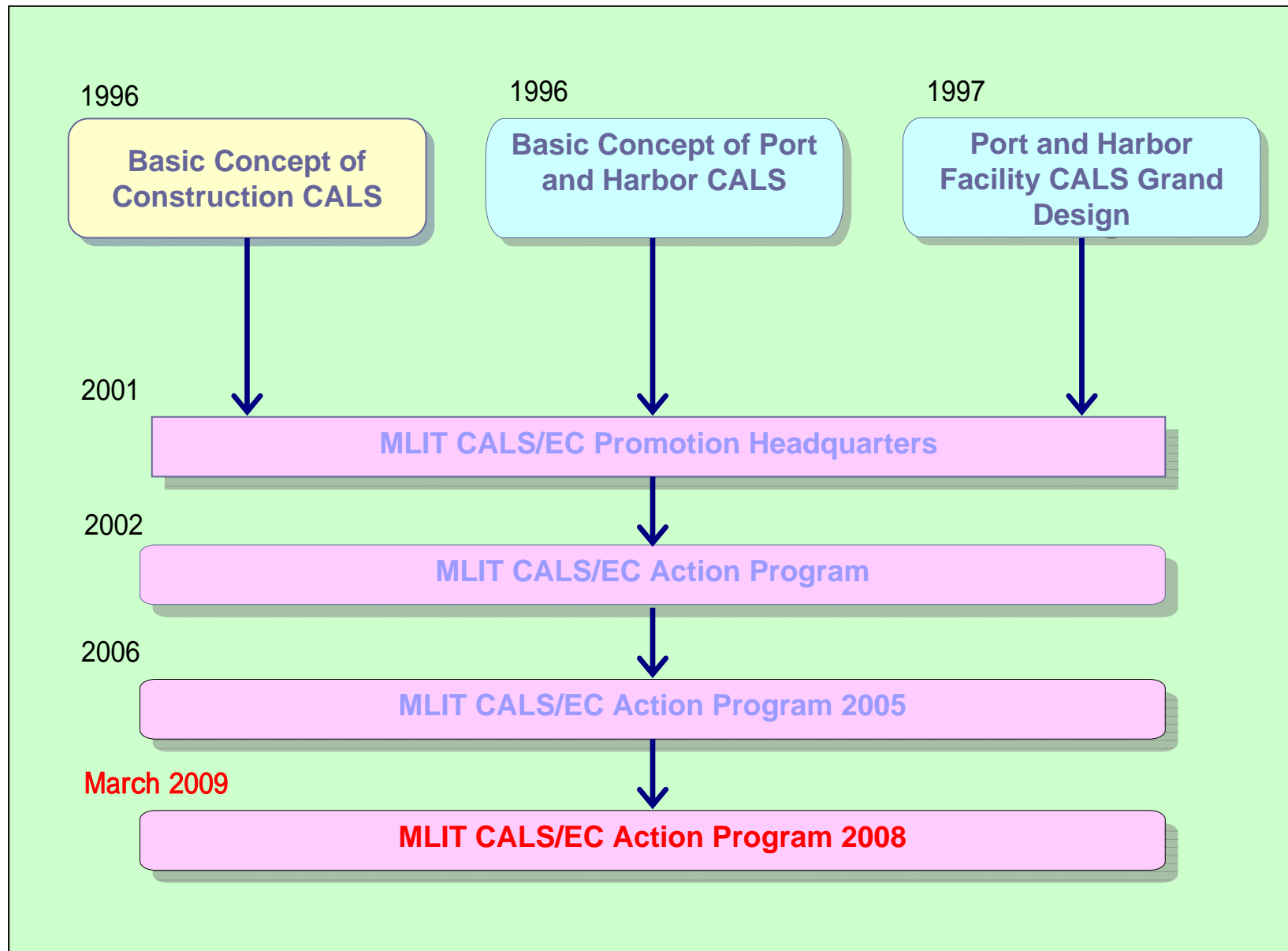
### Purposes of CALS/EC

- MLIT → Ensuring quality, lowering construction costs, and speeding up project implementation
- Contractor → Improving work process at construction site

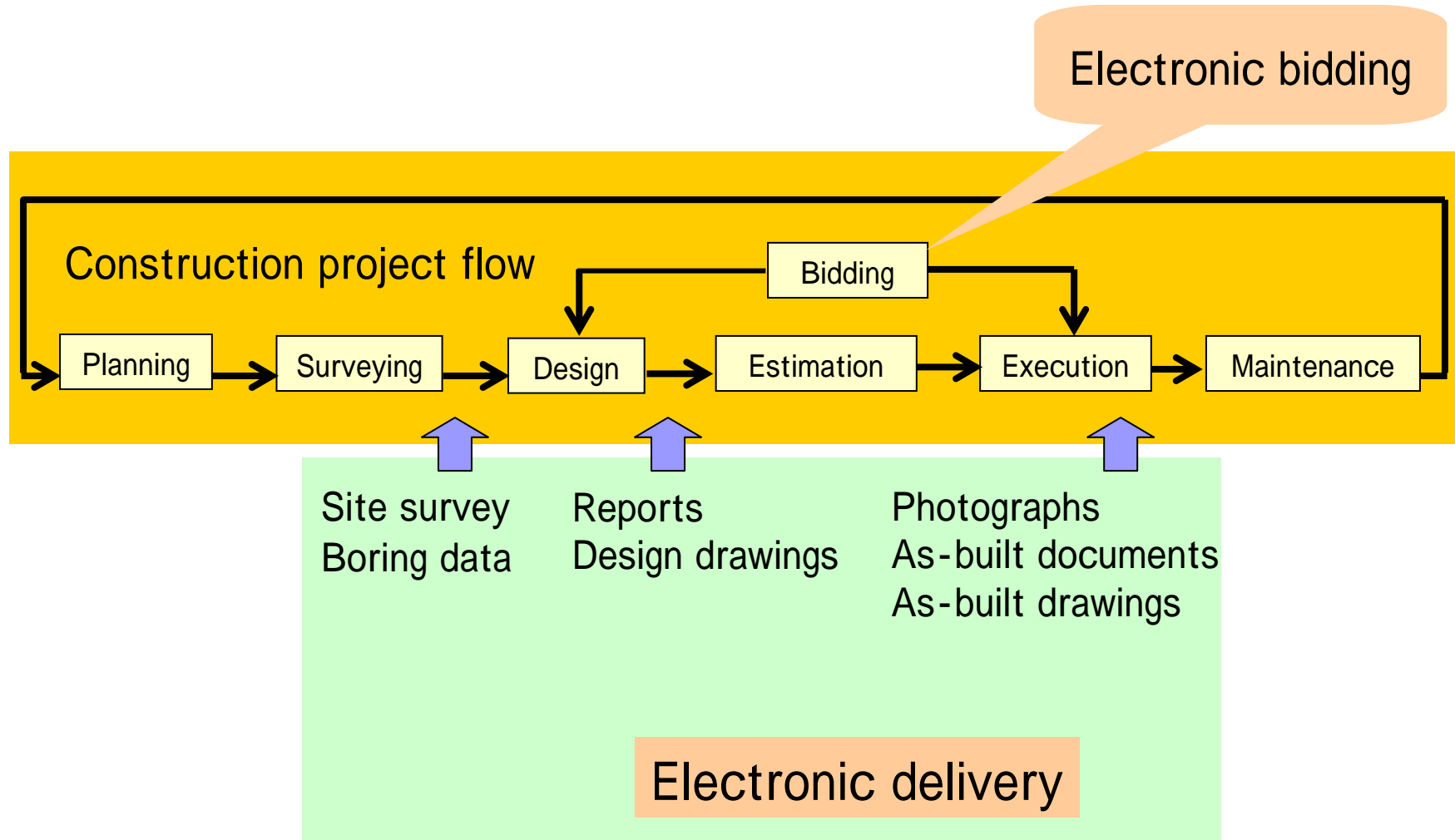
# Needs to Promote CALS/EC



# Initiatives by the Ministry of Land, Infrastructure and Transport



# Life-cycle Support



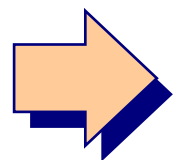
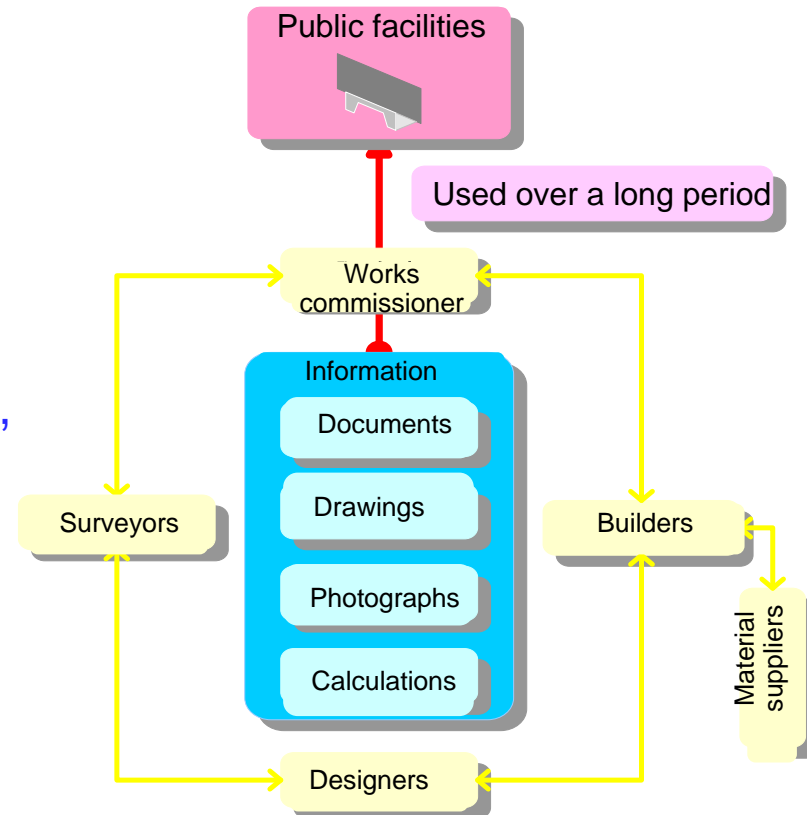
Electronic delivery intends to transfer data to the next phase

# Characteristics of public works from the perspective of ICT

There are many stakeholders and information is often exchanged

Many types of information are exchanged, and the data volume is large

Public facilities have a long life cycle, and information is used over a long period



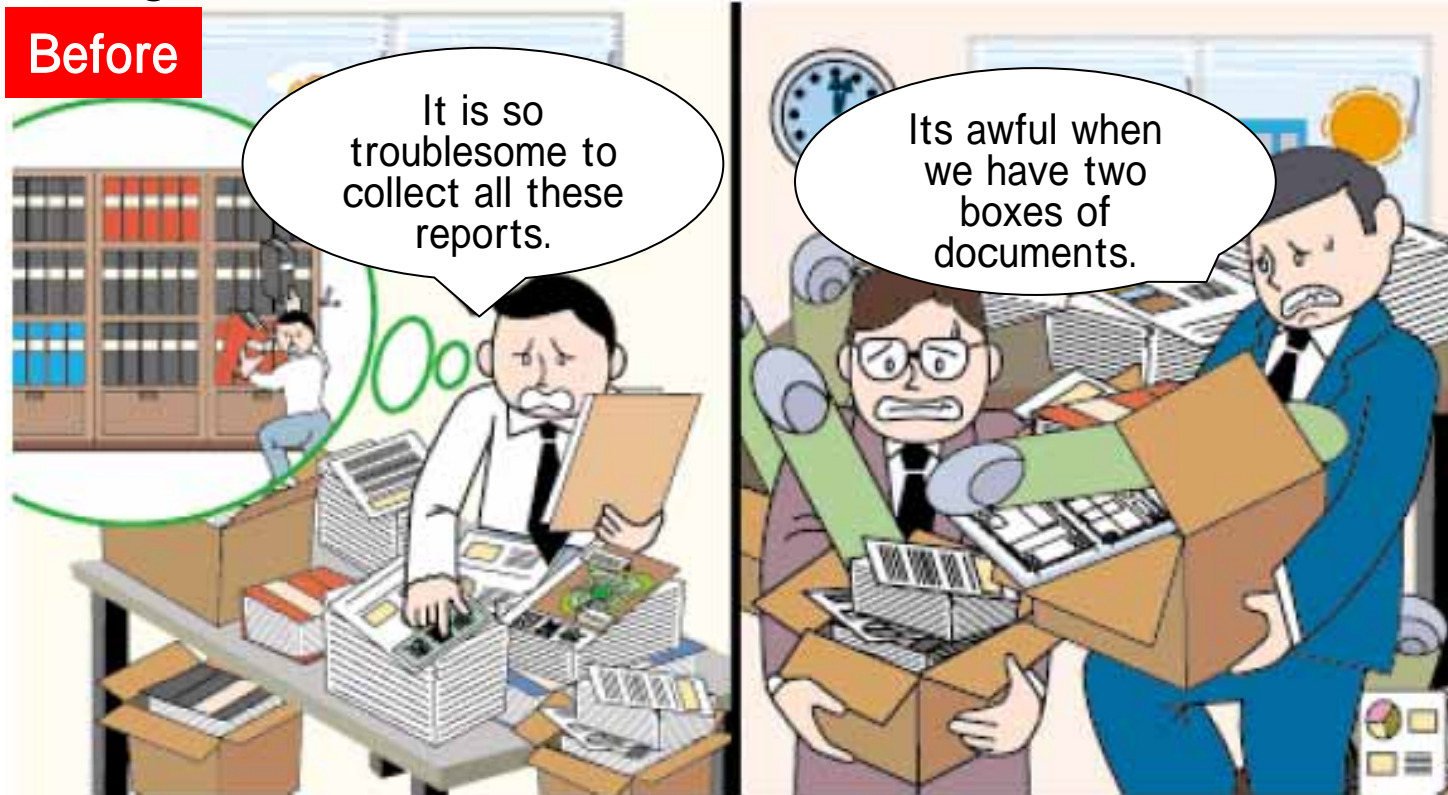
CALS Introduction is extremely effective.

**Work improvement  
by CALS/EC  
Before vs After**



# Design Phase

## Lending documents to Contractor



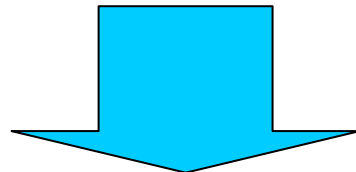
Before

It is so troublesome to collect all these reports.

Its awful when we have two boxes of documents.

MLIT

Consultant co.

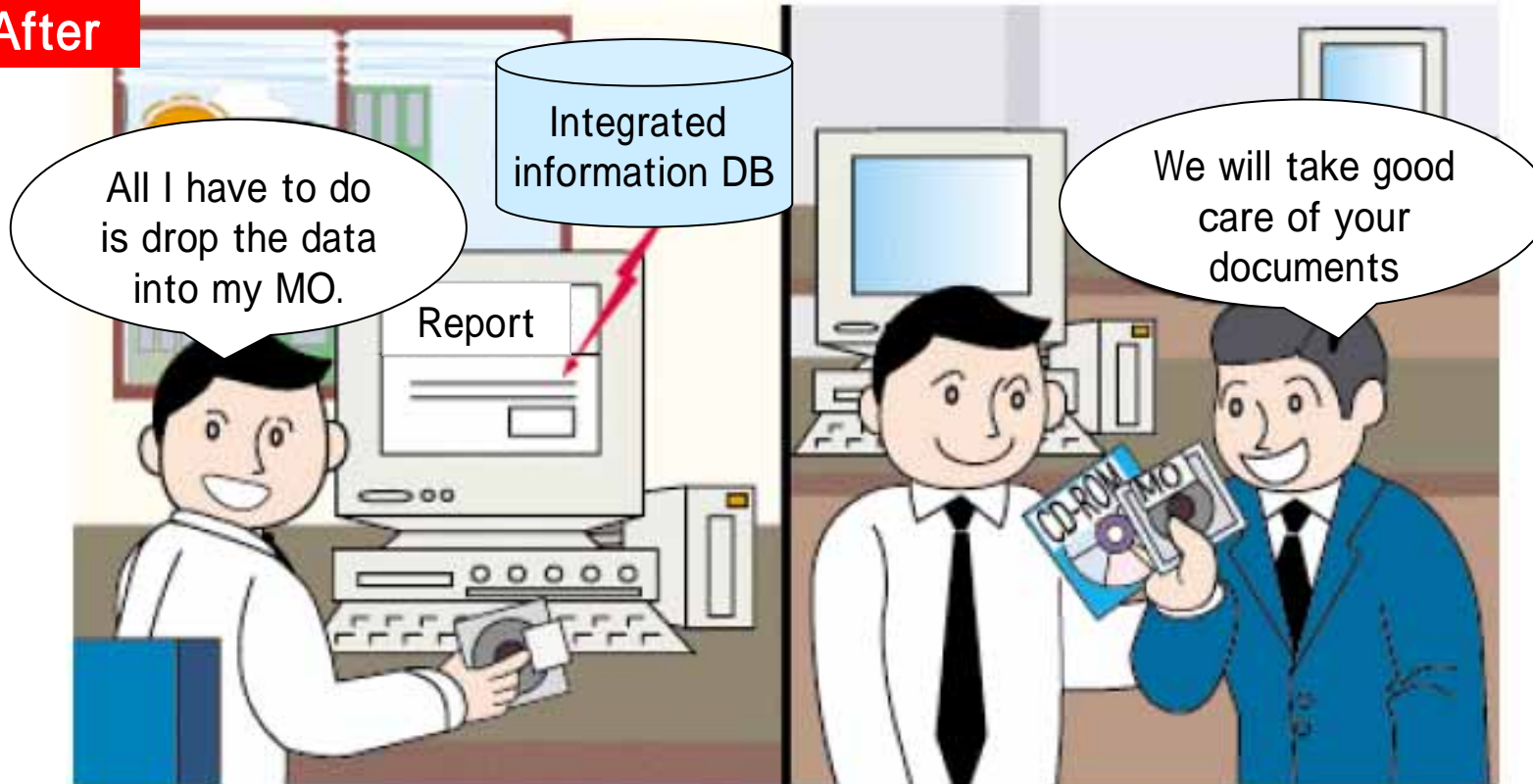


Before: a mountain of paper documents for the design were collected, organized, and delivered.

# Design Phase

Lending documents to Contractor is organized

After

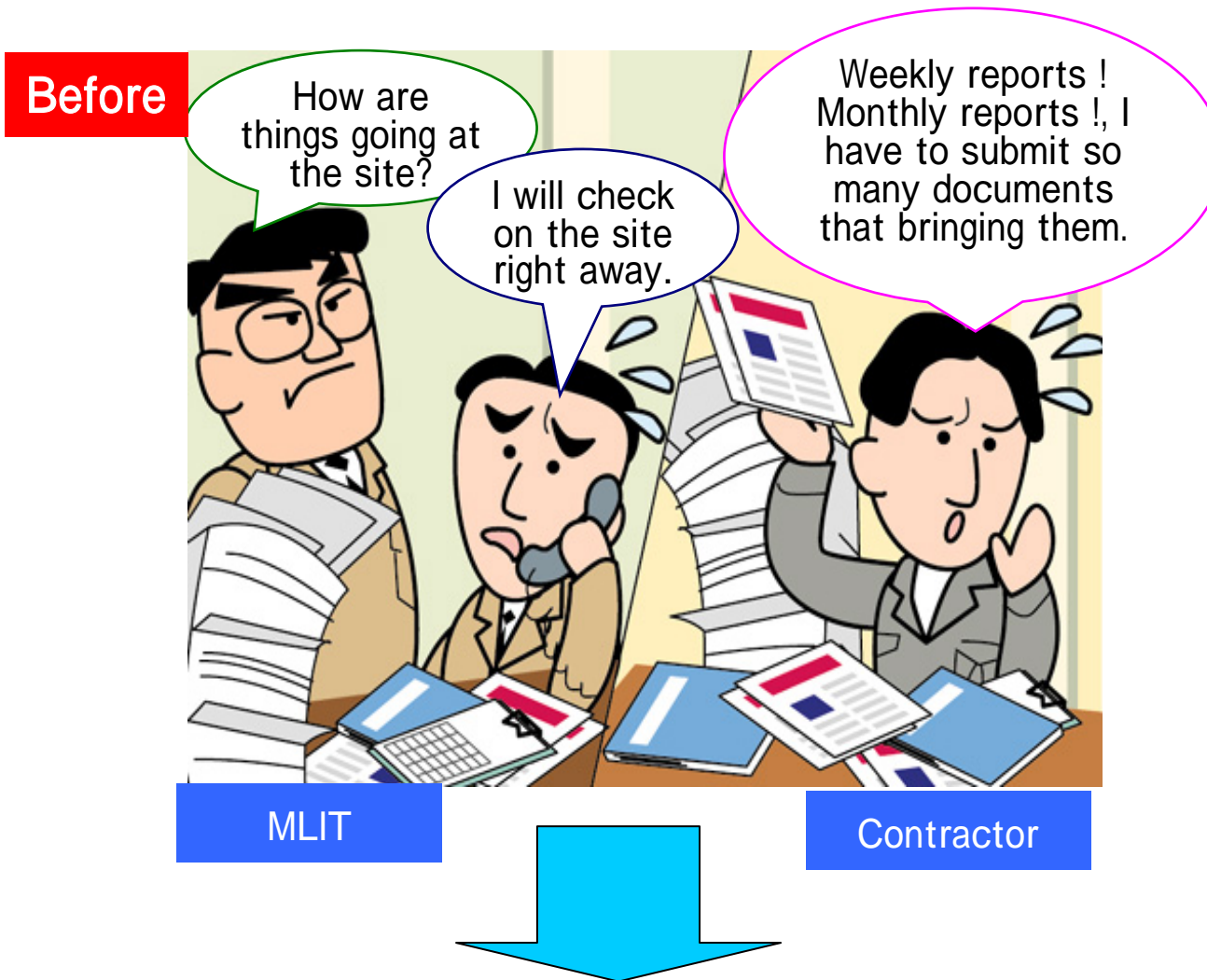


MLIT

Consultant co.

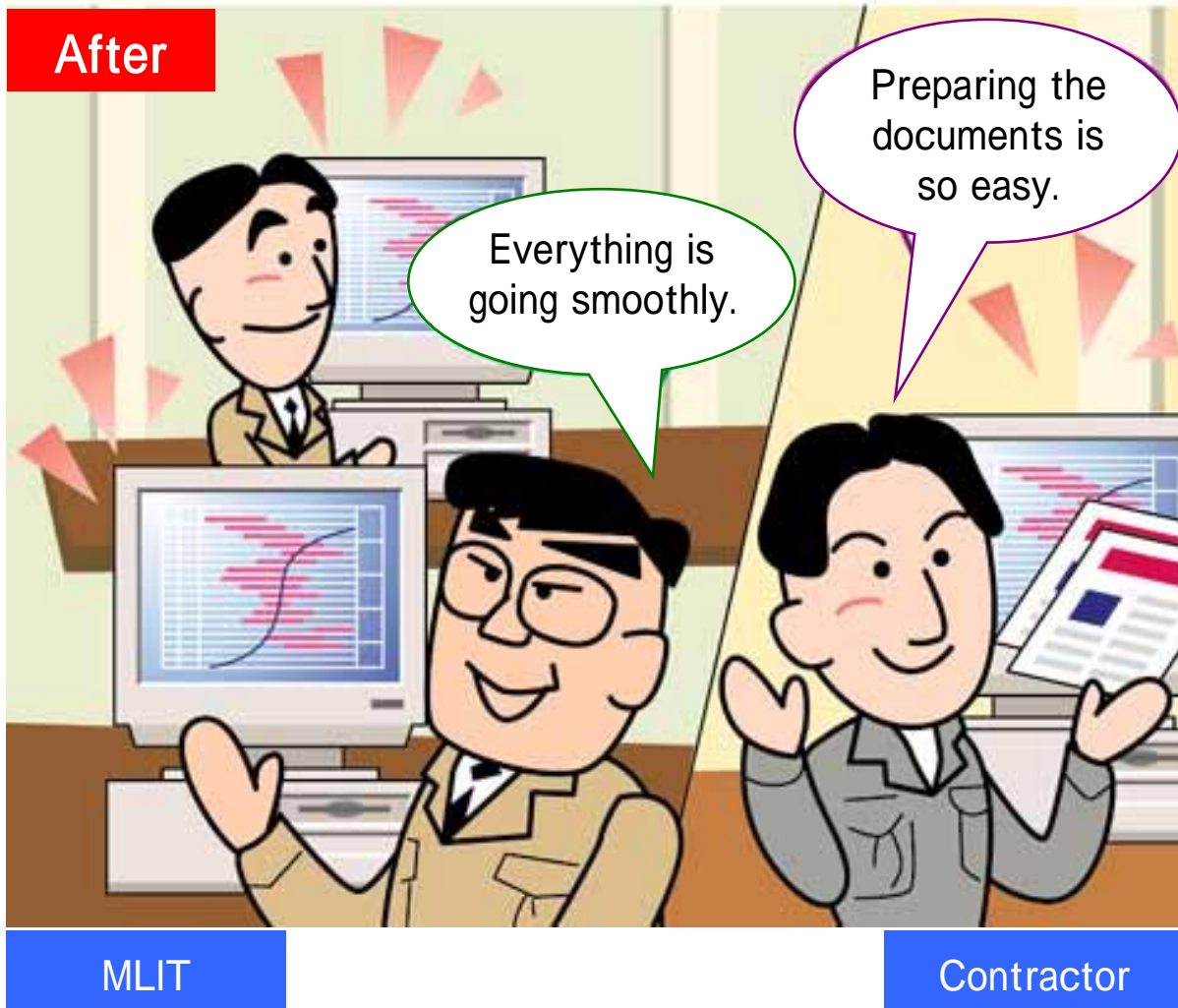
After: Designers can search an integrated database for the information they need and reuse the electronic data without processing it.

# Construction Phase



# Construction Phase

construction management goes efficiently by electronically exchanging and sharing work related information



# Maintenance Phase

Before



Patrol

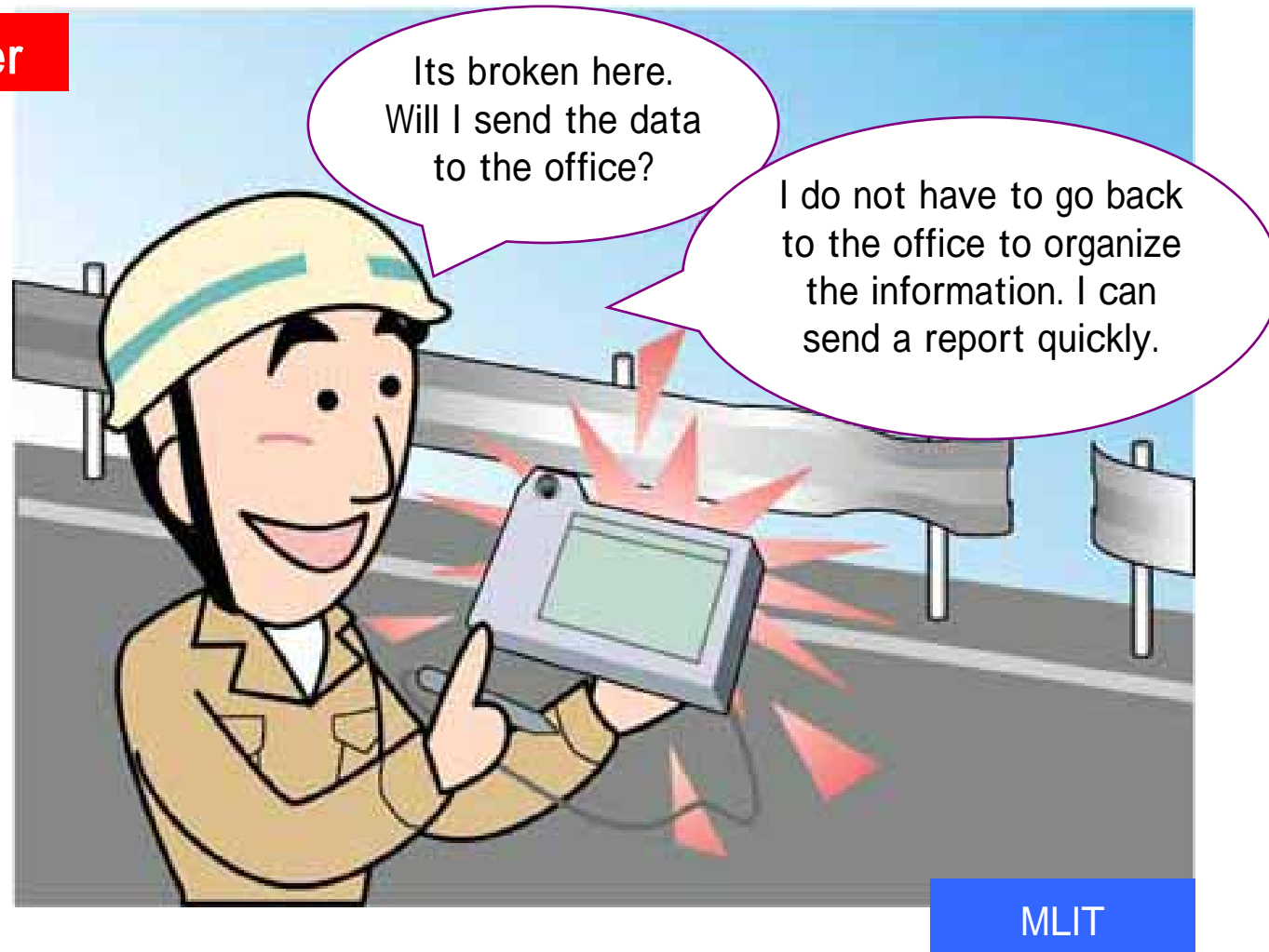
MLIT

At the office

# Maintenance Phase

Checking data in a maintenance DB and registering data to the DB

After



# Evaluating electronic deliveries

- An important part of CALS/EC  
FY2004: Applied to all works in MLIT
- Start of storage and control of electronic products
- ISO standardized CAD format (SXF) is popular
- Unresolved problems:
  - Complexity of inspections of final products
  - Submitting both paper and electronic products
  - Insufficient understanding  
(low information literacy)



## Action Program 2008

Based on the outcome of the CALS/EC Action Program in the past, MLIT has been developing a construction and production system using ICT.

The Action Program has 6 targets to improve works productivity, increase efficiency and achieve transparency.





## Targets of the Action Program 2008

- Target** Smoother communication between governments and contractors
- Target** Use available electronic data throughout surveys, planning, design, construction and maintenance
- Target** Improve the quality of works by promoting the IT (or Intelligent) construction system
- Target** Develop testing technology compatible with electronic delivery
- Target** Promote CALS/EC



Target Smoother communication between governments and contractors

- Achieve smoother communication between governments and contractors by using an information sharing system

### Functions of the information sharing system Ver.2

- Survey and design output registration function
- Design document registration function
- Basic works information management function
- Noticeboard function
- Schedule function
- Form creation function
- Approval function
- Documentation management function
- Works process management function
- Inspection document search and display function
- Electronic output creation support function
- Filing management system linkage function
- Data exchange and linkage function between information sharing systems

# Difference between information sharing systems and e-mail

### E-mail

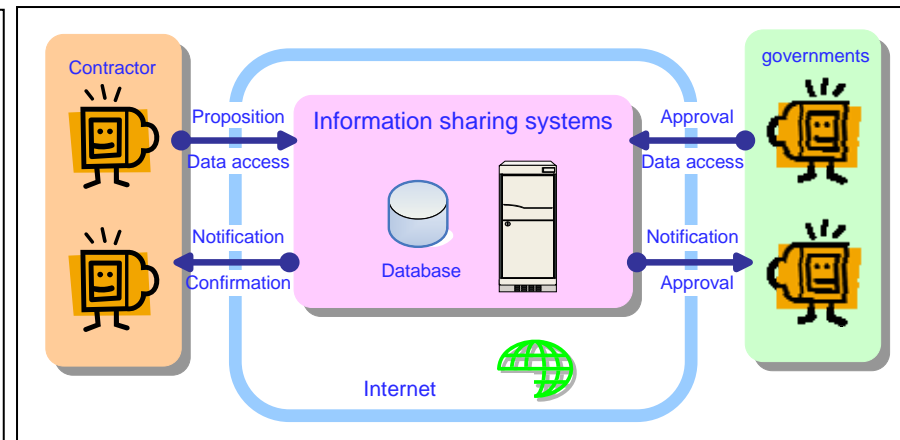
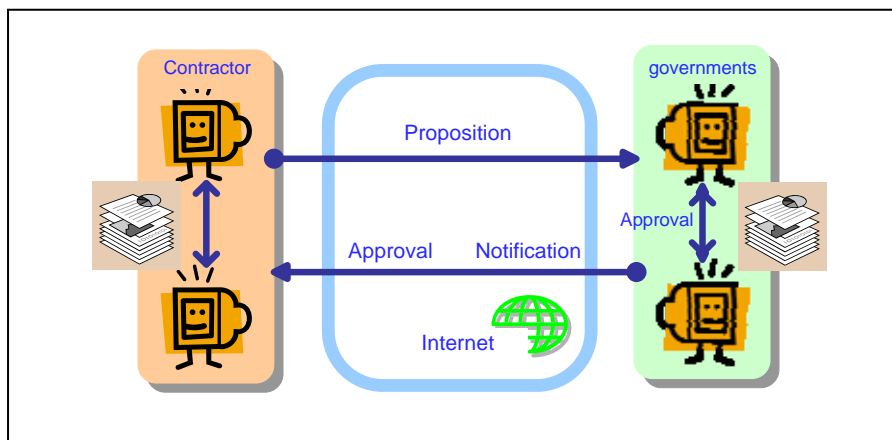
#### Characteristics

- × Difficult to manage information
- × Difficult to transfer information if contact person changes
- No need to introduce new system
- Already in widespread use by many people

### Information sharing systems

#### Characteristics

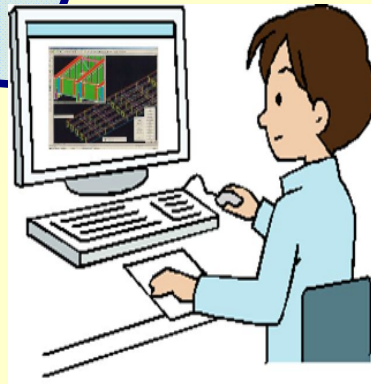
- Information can be centrally managed
- Easy to transfer information if contact person changes
- × Need to introduce new system
- × Acclimatization needed for operation



Target Use of available electronic data throughout surveys, planning, design, construction and maintenance

- All necessary documentation delivered electronically
- Development of electronic 3-D data system utilized throughout all phases of the construction works

Introduction of 3-dimensional CAD data

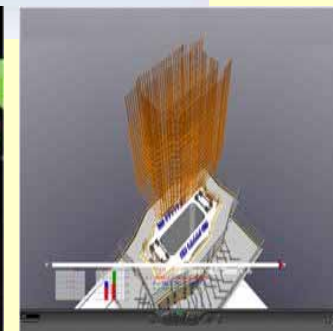
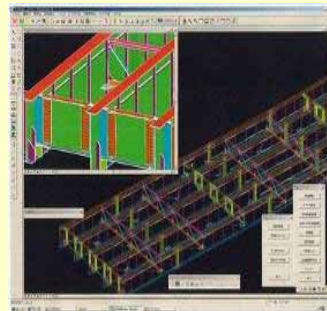
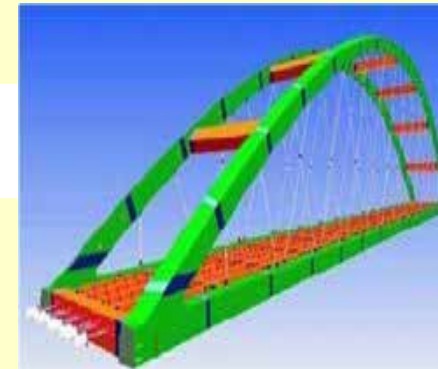


3-dimensional data obtained



(Digitization of data necessary of for IT construction system)

Model works



# Target Improve the quality of works by promoting the IT (Intelligent) construction system

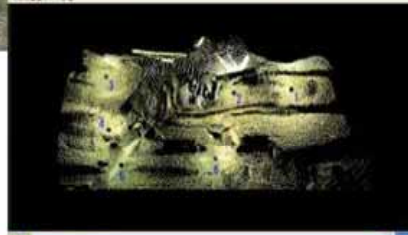
- Aim to improve the quality of works and reduce costs by making effective use of data in digitized construction

## ● Surveying by TS



Surveying using a 3-dimensional scanner

3-dimensional display of surveying data

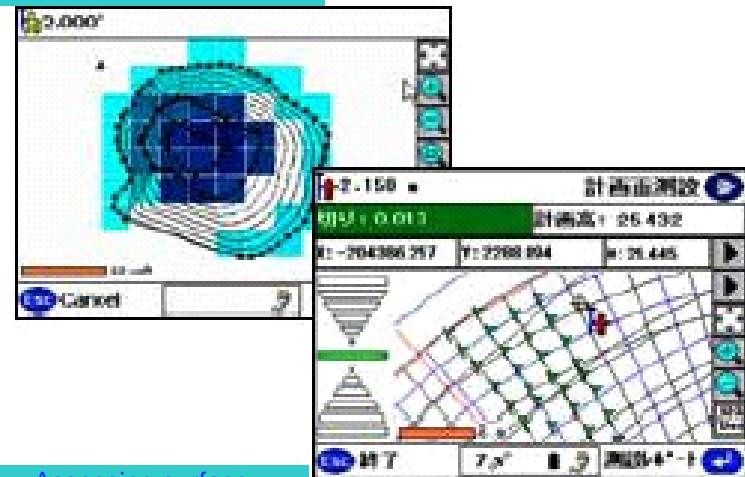


## ● Digitized construction

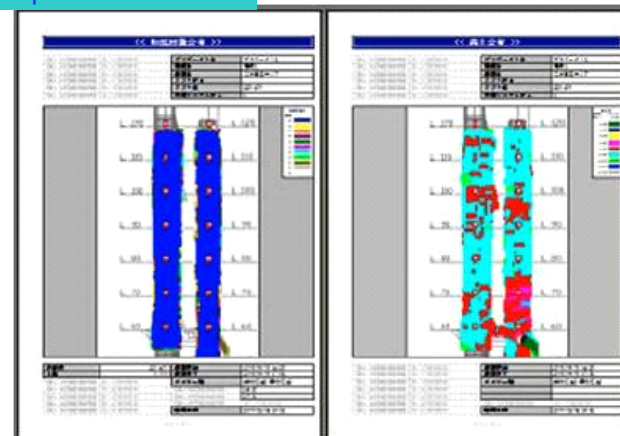


Remote operation of a backhoe

## ● As-built measurement



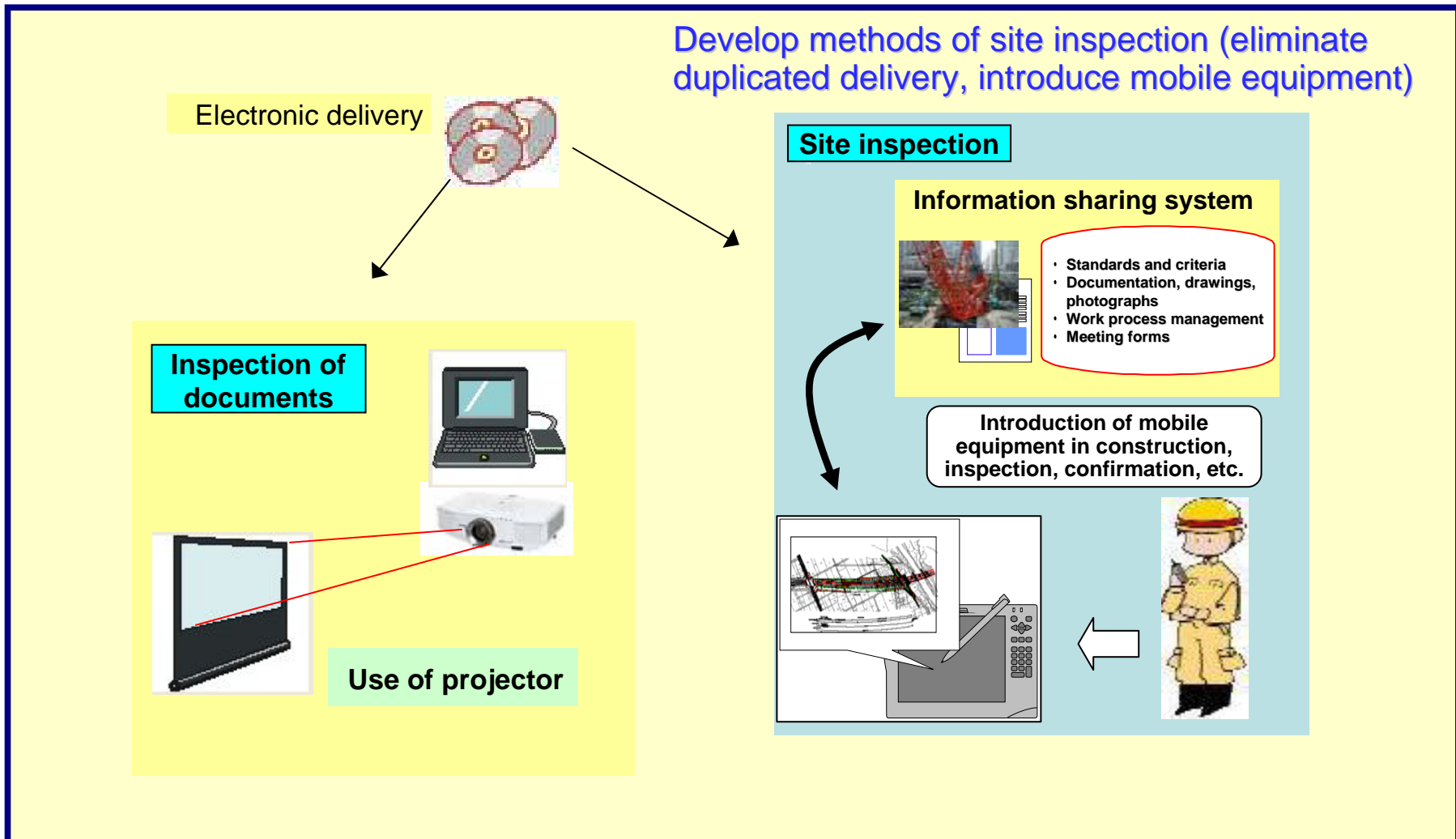
## ● Assessing surface compaction



Target delivery

Develop testing technology compatible with electronic

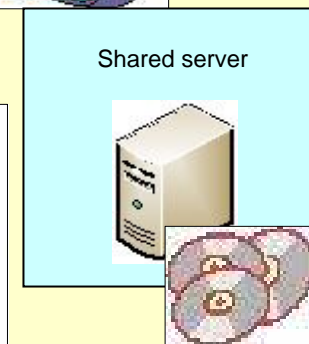
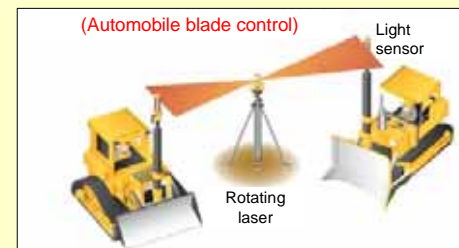
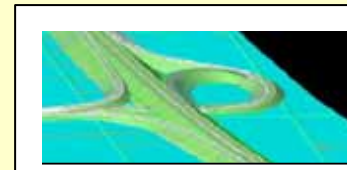
- Develop methods of site inspection to eliminate duplicated paper-electronic delivery, and save energy in inspection of documents



## Target Promote CALS/EC

- Promote the CALS/EC through systems of training and qualification, etc.
- Improve engineer's CALS/EC literacy

### Training of engineers for CALS/EC diffusion Develop related technical standards





Thank you very much  
for your kind attention.