

## One Year after the Opening of the Center

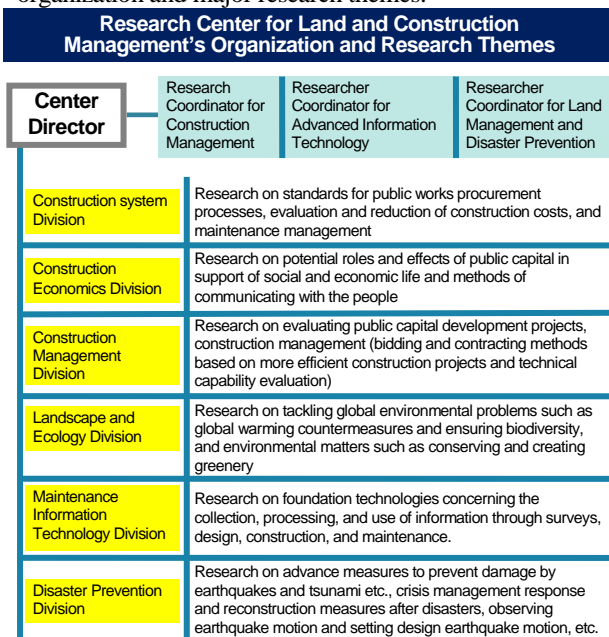
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### 1. Introduction

The Research Center for Land and Construction Management was established in April 2014 as an organization to do research on cross-sectional themes related with roads, rivers and other fields. As part of the reorganization of the NILIM, divisions of 3 centers and 1 department were rebuilt into this single center. It places particular emphasis on tackling current major governmental agendas such as prevention or reduction of damage caused by frequent disasters including the Great East Japan Earthquake, and maintenance of the seriously deteriorating infrastructure. It also succeeds to research on construction management that was previously undertaken by the former Research Center, by developing new perspectives. The following chart shows the Center's organization and major research themes.



### 2. 1 Major research efforts in the first year

#### (1) Disaster prevention and reduction

Under SIP, the Cabinet Office's new R&D budget system, the Center has started "Development of Real Time Infrastructure's Damage Information Collection, Summarization and Sharing Technologies" in order to realize rapid initial response when a disaster occurs. Along with the Disaster Prevention and Reduction Research Committee formed inside of the NILIM, the Center works cooperatively with the head office of the

MLIT and the regional development bureaus to operate the Disaster Prevention Technology Development Committee and to undertake R&D of disaster prevention technologies.

#### (2) Maintenance

As a research theme of the Maintenance Research Committee, the Center is working to build a maintenance process that incorporates the perspective of risk assessment in order to contribute to streamline the maintenance process for various facilities.

Besides, the Center is also conducting researches on ordering, estimation, inspection methods for infrastructure maintenance and repair works and on the construction of a database of past facilities' records.

#### (3) Quality control of works

In June of last year, the Bill for Ensuring the Quality of Public Works was revised, stipulating measures to foster potential future labor to prevent the shortages, clarification of the employer's responsibility for appropriate design and estimation, and strengthening measures to introduce and apply diverse bidding and contract systems to achieve suitable procurement.

To achieve these goals, two guidelines are being prepared: the new "Technical Proposal Negotiation Method" implementation, and the application of diverse bidding and contract systems.

#### (4) Information Infrastructure

The Center conducts researches on the utilization of road related information obtained by GIS, in order to enhance road management and utilization.

It has performed trial operation of road information distribution using the Road Section Identification Data set based on government-private sector cooperation. And Fundamental Geospatial Data of Road has reached the trial stage of its use in a model office for efficient management, for example, monitoring the state of its owned facilities and property of other authorities, etc..

### 3. Future developments

From the point of view of dealing with cross-sectional issues, that is a purpose of the establishment, the Center aims to achieve innovations in work processes as its ultimate goal. It will, therefore, connect such main research topics as disaster prevention, information infrastructure, and construction management, and tackle the following major tasks.

#### (1) Disaster response's innovations

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#### [1] Early clarification of conditions

Regarding initial response to disasters at the earliest stage when it is difficult to obtain information, but when it is considered possible to improve greatly the quality and to expand the quantity of information with the aid of the latest tools such as satellites or unmanned air vehicles and new information acquisition technologies such as image processing technologies. In particular, it is necessary to be able to quickly gather information from remote locations concerning the scale of the disaster and precise information about damage, which were types of information collected by manned patrols or field surveys previously.

#### [2] Reconstruction measure management

Along with early damage clarification technologies, other important themes are establishing restoration organizations according to the damage level and operation technologies.

The Center is researching methods of estimating the required personnel necessary and quantities of equipment and materials according to the scale and degree of damage, methods of setting activity units etc. and calculating the necessary reconstruction period according to the reconstruction organization scale, and it is expected to establish a disaster response operation method based on the results of these efforts.

#### (2) Innovations in construction production systems

##### [1] Computerized construction

Progress in CAD technologies enables the simplified use of 3D data as construction information, and improves the efficiency and quality of all work in the process: design, construction and maintenance.

In the area of computerized construction using 3D design data, the Center is gradually advancing its application into construction sites. Besides, progress control using total stations has been more and more introduced mainly for the earthworks.

In order to reduce the further burden on both the employer's and the contractor's sides, it is desirable to widely apply the said data to the contract implementation procedures by using construction information in the series of supervision and inspection processes, applying it to the progress payment method and so on. We wish to conduct research on utilization methods while cooperating with construction sites.

##### [2] Establishing a quality assurance cycle

Every stage of the procurement processes affects the quality of the works from the technical evaluation before signing a contract to the supervision and inspection during the construction. The quality assurance method to be emphasized differs according to characteristics of the works: those that place high expectations on improvement of quality by technical proposals by the contractor, those that must prioritize certain execution by a contractor considered technically reliable who has accurately assessed the execution environment and so on.

For the works executed by local companies, the level

of the works is not always very high. In such cases, it is important to select a reliable contractor that can perform work reliably and to appropriately check and inspect the works' execution process. It is vital to establish a system that takes past performance of the contractors, which is based on precise evaluating criteria for quality of work including the difficulty of the work according to the execution environment and execution process etc., into account during the bidding evaluation process. It permits sustainable improvement of the companies' technical ability and the quality of works.

##### [3] Collaboration of technologies

The players in the construction production system—the employer, the designer, and contractor—must supply the Japanese nation with good quality infrastructure by providing technical capabilities according to their respective roles. Timely communication is, however, limited due to the transparency in some cases, and this limitation appears to affect the efficient utilization of each player's technologies, which would result in inefficiency of production or quality degradation of the products.

The "Technological Proposal and Negotiation Method" that is a new bidding and contract system, is a method that allows the contractor to participate in the process of design, and also permits sharing know-how with the other players, which have been separated. We wish to establish effective utilization methods to apply to works requiring advanced construction technologies.

#### 4. At the end

The Center's research targets basic areas for several fields and, at the same time, its achievement is to be evaluated and improvement methods are to be studied only in the implementing process. For that reason, we will continue researches through collaboration among each field's R&D and related departments.