

Technical Cooperation

1. Introduction

The research policy of NILIM provides, as a basic attitude, “Aim at new technical development by implementing technical cooperation and integration widely among industry, university and government,” and, as preparedness for research, “Establish an efficient research system in cooperation with external organizations while recognizing our own strengths and weaknesses.” The following introduces representative examples of such cooperation.

2. Examples of coordination and cooperation with related administrative bodies

NILIM carries out many research projects with project costs, etc. that lead directly to policy development in cooperation with the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). Comprehensive technical development projects (comprehensive projects) and administration cost itemized budget projects are examples of particularly large-scale research subjects. Among important research subjects concerning construction technologies, comprehensive projects address particularly urgent issues with a wide target area. This research is conducted comprehensively and systematically in cooperation with industry, universities and government under the leadership of administrative departments in project planning and promotion. The administration cost itemized budget is reviewed directly by the Ministry of Finance, and is used to carry out comprehensive research leading to the creation of new policies. **Table-1** shows the subjects of comprehensive projects implemented in fiscal 2020, and **Table-2** shows research conducted using the administration cost itemized budget.

3. Examples of cooperation with the private sector, universities, etc.

In addition to joint research conducted jointly by NILIM with other organizations and contract research outsourced to NILIM by organizations already conducting the research, NILIM is also engaged in diverse other types of cooperation, which can be roughly classified as follows.

The condition of implementation of joint research and contract research in fiscal 2020 is shown in **Table-3** and the following table, respectively.

<p>I. Research institutionalized by NILIM</p> <p>(1) Joint research, (2) Contract research (research publicly offered by NILIM), (3) Contract research (publicly offered by Council), (4) Budget of other ministry or agency (PRISM)</p> <p>II. Research institutionalized by other organizations</p> <p>(5) Technical research association</p> <p>III. Research not institutionalized but established to a certain extent</p> <p>(6) Technical public offering, (7) Social experiment, (8) Workshops and study groups</p> <p>IV. Research conducted by devising operation</p> <p>(9) Cooperation with policy development by MLIT, (10) Cooperation with municipal projects, (11) Workshops with universities and the private sector</p>
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4. Conclusion

In addition to the above, NILIM is also engaged in various other forms of technical cooperation, such as research activities and revision of technical standards through industry-university-government cooperation as committee activities of academic societies and

Table-1 Comprehensive technical development projects implemented in fiscal 2020

Subject	Research period	Department / Center in charge
Research on construction productivity improvement with full utilization of ICT	2017-2020	Infrastructure Management
Development of design / construction techniques for mixed structure buildings using new wood material	2017-2021	Building
Research on upgrading of construction production systems using AI	2017-2020	Infrastructure Management
Development of suburban residential area revitalization techniques responding to mature society	2018-2022	Housing / Building / Urban
Technical development contributing to urban revitalization / resilience by rationalization of structural regulations related to buildings and ground	2020-2023	Building / Urban

Table-2 Research based on administration cost itemized budget implements in fiscal 2020

Subject	Research period	Department / Center in charge
Research on comprehensive management of sewer pipelines	2018-2020	Sewerage
Development of pre-analysis method for sediment disaster caused by large-scale earthquake	2018-2020	Sabo
Development of existing RC member evaluation techniques contributing to life extension / improvement of exterior / waterproofing membrane of building	2018-2020	Building
Establishment of visualization method for barrier-free effect according to life stages	2018-2020	Housing
Research on quantitative evaluation method for urban environment improving effect of green space, etc.	2018-2020	Urban
Research on immediate damage estimation method for port facilities in a major earthquake	2018-2020	Port and Harbor
Research on levee collapse perception / flood situation forecast for communicating information that enables quick actions for evacuation / flood prevention	2019-2020	River
Development of techniques for quickly judging the soundness of base buildings damaged by earthquake	2019-2021	Building
Research on wide-area cooperation of urban functions in a local city	2019-2021	Urban
Development of an evaluation technique for efficient utilization of environmental conservation technology in coastal area	2019-2021	Coastal, Marine and Disaster Prevention
Development of terminal congestion index contributing to improvement of punctuality of container ships	2019-2021	Port and Harbor
Research on upgrading of safety measures of civil construction considering environmental changes at the site	2020-2022	Infrastructure Management
Development of plan assessment technique for urban problem-solving to support promotion of smart cities	2020-2022	Urban
Research on quantification of effects on preventive measures for management failure of abandoned houses	2020-2022	Housing
Research on design targets for independent energy systems for continued residence after disasters	2020-2022	Housing
Development of performance index and evaluation program contributing to advanced fire-prevention performance of non-residential buildings	2020-2022	Building
Research on introduction of self-driving airport snow removal vehicles	2020-2022	Airport

associations. In the future, we intend to continue our research efforts through diverse forms of cooperation with industry, universities and government agencies.

Pattern	Name of Council, etc.	No. of cases
Research publicly offered by NILIM		3
Research publicly offered by MLIT Council		
New Road Technical Conference		24
River works (sediment disaster prevention) technology research and development		10
Sewerage B-DASH		12

Table-3 Joint research conducted in fiscal 2020

Subject of joint research	Partner organization	Research period	Department / Center in charge
Research on early detection of sediment disasters using observation / monitoring data of mountainous watershed	National Institute of Advanced Industrial Science and Technology (AIST)	2016-2020	Sabo
Research on technical standards, etc. in building, housing and urban fields	Building Research Institute	2016-2021	Building / Housing / Urban
Joint research on development of sediment disaster monitoring methods using Advanced Land Observing Satellite No. 2 "Daichi No. 2"	Japan Aerospace Exploration Agency (JAXA)	2017-2021	Sabo
Joint research on technological development for practical use of next-generation cooperative ITS	29 entities and 32 organizations including automakers, electrical equipment manufacturers, related foundations and expressway companies	2017-2022	Road Traffic
Joint research on seismic performance verification experiment of mixed structure buildings using new wood material	National Research Institute for Earth Science and Disaster Resilience	2017-2021	Building
Joint research on life extension of weathering steel bridges	Public Works Research Institute (PWRI), Japan Bridge Association Inc., Japan Iron and Steel Federation, Nagaoka University of Technology, Nippon Steel Anti-corrosion Co., Ltd.	2017-2020	Road Structures
Joint research on maintenance of concrete floor slabs	PWRI, Japan Prestressed Concrete Contractors Association	2018-2021	Road Structures
Joint research on inundation forecast system in Tokyo	Waseda University	2018-2021	River
Joint research on ETC 2.0 data distribution service	ITS Technology Enhancement Association	2018-2022	Road Traffic
Joint research on upgrading steel bridge performance evaluation / restoration techniques	PWRI, Japan Bridge Association, Inc., Japan Iron and Steel Federation, Nagaoka University of Technology, Waseda University	2018-2021	Road Structures
Joint research on real-time utilization of strong motion index	National Research Institute for Earth Science and Disaster Resilience	2019-2020	Road Structures
Joint research on evaluation technology for road bridge performance	Japan Civil Engineering Consultants Association, Japan Federation of Construction Contractors, Japan Bridge Association Inc., Japan Prestressed Contractors Association	2019-2021	Road Structures
Joint research on management of special / huge bridges	Honshu-Shikoku Bridge Expressway, Kyoto University, Osaka University, PWRI, Tokyo Rope Mfg. Co., Ltd., Shinko Wire Company, Ltd.	2019-2021	Road Structures
Joint research on continual improvement of maintenance plans for existing road bridge groups	Japan Civil Engineering Consultants Association, Kyoto University, Osaka University, Kyoto-fu, Ibaraki Prefecture	2019-2021	Road Structures
Joint research on sediment / flood control technology	University of Tsukuba	2019-2021	Sabo
Joint research on integration of AIS data for Tokyo Bay and use in disaster prevention	Kanto Regional Development Bureau (MLIT)	2019-2021	Ports and Harbors
Joint development of inspection / diagnosis system for port and harbor facilities utilizing 3D / 4D data	Japan Marine Surveys Association	2019-2021	Coastal and Marine
Joint research on development of rapid emergency recovery of wastewater treatment functions after inundation damage	PWRI	2020	Sewerage

Table-4 Examples of cooperation with private sector, universities, etc. implemented in fiscal 2020

Pattern	Subject	Purpose and form of cooperation	Participant	Research period	Department / Center in charge
③	Breakthrough by Dynamic Approach in Sewage High Technology Project (B-DASH Project)	Utilize local governments, private enterprises, universities, etc. for practical use of innovative techniques not yet generalized in sewerage	Joint Research Organization (universities, private enterprises, other national research centers, local governments, etc.)	2011 -	Sewerage
⑥	Project for introduction / utilization of innovative technologies for drastic improvement of productivity in construction sites	Publicly offer a project for improving productivity with new technologies such as IoT and AI by obtaining real-time data from construction sites	Consortium consisting of private enterprises, universities, etc.	2018 -	Infrastructure Management
①⑦	Examination of new services using ETC 2.0 data	In order to strengthen the mobility of communities, solicit new service proposals using ETC 2.0 data from the public. Provide ETC 2.0 data to private enterprises that made proposals for verification leading to practical use.	Private enterprises	2018-	Road Traffic