March 31, 2008

Fiscal year 2007　Evaluation results by Public Works Research Institute Internal Evaluation Committee

1. Update of Internal Evaluation committee meetings

In accordance with Independent Administrative Agency Public Works Research Institute Evaluation Guidelines, the updates of the Internal Evaluation Committee meetings held in fiscal year 2007 and the deliberated themes are shown below.

1.1 Meetings updates ① (The 1st Internal Evaluation Committee meeting)

The priority research Project themes Tsukuba Central Research Institute and International Center for Water Hazard Risk Management (hereinafter called ICHARM) is working on at present are set in the current Mid-term Plan for 2006~2010 and many of them were started in 2006. Therefore, there were no priority　Research projects which had Ex-post evaluation this fiscal year. Also, due to the newly started research categories, there were no strategic research themes which had Ex-post evaluation.

Research policy study, by the way, is a study, which was started in fiscal year 2007, for considering the future direction of technology development by sorting current technological issues and accurately reflects the needs in research from a long-term viewpoint. In principle, this study is under the short term budget and the small scale budget.

Two of the 1st Internal Evaluation Committee meeting were held in fiscal year 2007. In the second meeting, the 4 themes that had evaluation in the first meeting (3 of which were not judged) had Ex-post evaluation after having revised the research implementation plan.

The first meeting

May 22 & 31, 2007

Ex-Post evaluation	Priority research projects, Individual themes	3 themes
Ex-Post evaluation	Strategic research	10 themes
Ex-Post evaluation	General research	17 themes
Ex-Post evaluation	Budding research	1 theme
Examination of a new research policy study		1 theme

Interim evaluation	Priority research projects	3 themes
Interim evaluation	strategic research	1 theme
Interim evaluation	General research	9 themes
Ex-Post	Strategic research	1 theme
Ex-Post	General research	23 themes
Ex-Post	Budding research	3 themes

The second meeting

November 27, 29, & 30, 2007

Ex-Post	Priority research projects	2 themes (of which 1 theme)
Ex-Post	Strategic research	5 themes
Ex-Post	General research	7 themes
Examination of a new research policy study		1 theme

1.2 Meeting update ② (The 2nd Internal Evaluation Committee)

Just as same as Tsukuba Central Research Institute and ICHARM, Civil Engineering Research Institute for Cold Regions did not have individual themes of important project or strategic research themes which had Ex-post evaluation.

Three of the 2nd Internal Evaluation Committee meetings were held in 2007. At the first meeting, the important project research themes which were related to the results in 2006 were reported on and the progress of the themes managed jointly with Ministry of Agriculture, Forestry and Fisheries was confirmed. In the second meeting, the progress of the important research project themes and the cooperative themes shared with Tsukuba was reported, and also research policy studies were proposed and examined. In the third meeting, a mid-stage evaluation of existing themes that had been revised due to the transfer of the technology development related projects from Hokkaido Regional development bureau, which is scheduled in 2008, at the same time as the new themes had Advance evaluation.

The first meeting (Result report on the important project research in 2006, etc)

April 24, 2007

Interim evaluation	Priority research projects	1 theme
Progress check	Themes jointly managed with Ministry of Agriculture, Forestry and Fisheries	9 themes (Priority research projects general themes 2, individual themes 7)

The second meeting (Report on progress of the priority research projects)

December 10 ~ 11, 2007

Examination of the new research policy studies	14 themes

The third meeting (Advance and Interim evaluation of the research themes due to the transfer of technology development related project from Hokkaido Regional Development Bureau)

January 22 ~ 24, 2008

Ex-Post evaluation	Priority research projects, Individual themes	5 themes
Ex-Post evaluation	Strategic research	6 themes
Ex-Post evaluation	General research	17 themes

Interim evaluation	Priority research projects general themes	7 themes
Interim evaluation	Priority research projects individual themes	22 themes
Interim evaluation	Strategic research	1 theme
Interim evaluation	General	16 themes

2. Structure of Internal Evaluation Committee

The 1st Internal Evaluation Committee (regarding research conducted by Tsukuba Central Research Institute and International Center for Water Hazard and Risk Management)

Chairman: Deputy Chief Exective

Committee members: Executive directors for Research Coordinator(Tsukuba, CERI), Special Executive Director for Research Coordinator, Executive Director for Geology, General Affairs Department Manager, Planning and Research Administration Department Manager, Construction Technology Research Department manager , Material and Geotechnical Engineering Research Group Manager, Earthquake Disaster Prevention Research Group Manager, Water Environment Research Group Manager, Hydraulic Engineering Research Group Manager, Erosion and Sediment Control Research Group Manager, Road Technology Research Group Manager, Structures Research Group Manager, Water-related Hazard Research Group Manager, Deputy Director of Planning and Research Adminiatration Department, Deputy Director for Research Coodination (Tsukuba, CERI)

Office: Research Planning Division, Planning Department

The 2nd Internal Evaluation Committee (research conducted by CERI)

Chairman: Councilor (CERI)

Committee members: Research Adjustment Director (CERI for Cold Regions), Research Adjustment Director (Tsukuba), Planning Department Manager, Technology Promotion Head quarter Head, Management Department Manager, Cold Region Basic Technology Research Group Head, Cold Region Hydrosphere Research Group, Cold Region Road Research Group Head, Cold Region Agriculture Foundation Research Group Head, Special Research Director, General Research Department Director, Research Planning Department Director

Office: Planning Division, Civil engineering Research Institute for Cold Region

3. Ex-Post evaluation results

The Ex-post evaluation was carried out based on the result reports and self-assessment by the person in charge of each research (The Head of Research, senior researchers) by choosing one out of the choices in Table-1 regarding “Research results (degree of goal attainment)”, “Presentation of results” and “Distribution of results”.

Table 1 Ex-Post evaluation items and choices

Items	Choice
Research results (degree of goal attainment)	1) The goals of the research have been attained and a significant technological contribution may be highly evaluated. 2) A part of the goals has not been attained but technological contribution may be highly evaluated. 3) Technological contribution was not always sufficient but the approach to the research may be well evaluated. 4) Not enough effort have been made and so improvement is required for future.
Result presentation	1) Appropriate 2) Slightly insufficient 3) Insufficient
Effort towards distribution of	1) Appropriate 2) Slightly insufficient

results	3) Insufficient 4) Others

3.1 Ex-Post evaluation results ① (The 1st Internal Evaluation Committee)

The 1st Internal Evaluation Committee meeting evaluation themes and the goals (main results for the important project research general themes) are all shown in Table-2.

Table-2 Themes to be post-stage evaluated

1. Strategic research

Research theme	Goals
Research on inspection method for internal defect in welded part of steel bridges.	・Investigation on factors that influence inspection results. ・Proposal on non-destructive inspections for welded joints of steel bridge pier corners by ultrasonic pulse echo technique. ・Proposal on inspection methods using existing ultrasonic pulse echo equipments for welding defects and cracks.

2. General research

Individual theme	Goals
Experimental research on categorization of snowy/ icy road surface.	・Road surface categorization guidelines that is easy to use on each site and enables expressing conditions of winter road surface based on common management standards.
Research on substance transfer in dam reservoirs ③	・Investigation on relationship between inflow amount of substances such as silicon, iron and their related substances and basin properties such as mainly forms and geological features.
Development of database for hydraulic/ hydrologic model evaluation	・Building a database for hydraulic/ hydrologic model evaluation
Research on snow avalanche factors' relationship with above the sea level heights and snow avalanche prediction.	・Investigation on relationship between piled snow/ weather condition on potential snow avalanche slope and above the sea level heights. ・Proposal on estimation methods for piled snow/ weather conditions in potential snow avalanche areas. ・Improvement on identification methods and statistical prediction methods for factors of occurrence of snow avalanche.
Research on advanced tunnel maintenance and management methods.	・Proposal of models that enable estimation of tunnel decay based on the conditions the tunnel is located.
Research on rationalization of tunnel supporting structures.	・Determination of standards supporting structures need to meet.
Research on performance evaluation for pumping stations using CFD.	・Proposal of performance evaluation methods for pumping stations using the standards of CED (Computational Fluid Dynamics).
Research on machine interface in remote operation of machines.	・Investigation to acquire information of work conditions such, as machine location and position, necessary for efficient remote operation in construction work. ・Proposal of methods to accurately transmit/ indicate work condition information to operators for efficient task execution.
Building database on salt damage of concrete structures and utilizing it for rationalization of maintenance & management.	・Sorting out the salt damage related instances in research on existing structures and identification of items to enter the database. ・Building of concrete salt damage database (surface salt amount, diffusion coefficient, etc). ・Proposal of rational anti-salt damage maintenance and

	management methods that utilize the database built as above.
Development of iron bar erosion inspection methods of actual structures	・Proposal of half-cell potential measurement of actual structures. ・Proposal of erosion possibility evaluation by half-cell potential measurement for steel materials.
Research on introduction of the international standards related to concrete structure designing.	Identification of problems regarding introduction of the international standards. Proposal of National Annex examples
Research on evaluation methods for river environment recovery at the basin level.	・Adjustment and evaluation of indexes used for ecosystem evaluation. ・Adjustment and evaluation of indexes used for river environment evaluation. ・Proposal of river environment evaluation basin GIS system.
Research on substance transfer in dam reservoirs②	・Investigation on auxiliary conditions of silicon, iron and their related substances based on biological phenomena in reservoirs.
Research on support force properties of shallow foundations that comes under load in earthquakes.	・Handy estimation methods for response displacement and residual displacement which occur to shallow foundations in large earthquakes.
Research on systemization of creek structures ②	・Required performance of main body joints and proposal of verification methods.
Research on steel/ concrete joint structures.	・Investigation on problems and improvements of joint structures. ・Investigation of the force transmission mechanism in steel/ concrete joint structures and proposal of a verification method for it.
Research on substance transfer in dam reservoirs ①	・Investigation on capturing conditions of silicon, iron and their related substances in reservoirs based on physical and scientific phenomena.
Research on design methods for discharge facilities for flood control of dams made specific for water management.	・Investigation on conditions of blockage of discharge facilities for flood control by sediment and driftwood. ・Development of design methods for discharge facilities for flood control that may prevent blockage by sediment and drift wood.
Research on planning methods for underground water drainage based on dynamic observation.	・Proposal of planning methods for underground water drainage based on dynamic observation.
Research on quick estimation methods for cut slope landslide scale by high precision surface displacement measurement.	・Proposal of high precision surface measurement technology and quick deformation scale estimation methods for landslide that occurs when cutting slope.
Experimental research on anti-seismic design methods for retaining walls that take critical conditions into consideration.	・Proposal of evaluation of external force on retaining walls in earthquakes. ・Proposal of anti-seismic design methods for retaining walls that take critical conditions into consideration.
Research on anti-seismic properties of concrete structures under 3D force.	・Development of 3D input simulation methods for seismic behavior of reinforced concrete structures. ・Development of anti-seismic design methods using 2D/ 3D input for reinforced concrete structures.
Experimental research on anti-seismic design methods for road piers using high performance materials.	・Proposal of durability/ deformation capacity evaluation formulae for reinforced concrete structures using high strength materials. ・Proposal of development durability/ deformation capacity evaluation formulae for steel pier structures with high elasticity which use high performance steel.

3. Budding research

Theme	Goals
Basic research on environmental stress detection technology using genetic analysis methods.	・Search for genes that are generated when aqua organisms com under environmental stress. ・Development of evaluation methods based on genes that are generated under environmental stress.
Basic research on environmental conditions where concrete structures are placed.	・Research on concrete structures exposure environment. ・Implementation of concrete sample exposure experiments. ・Experimental production of database for information acquired through environmental conditions and exposure experiments.
Research on property evaluation of liquidified soil for anti-seismic design.	・Investigation on factors that affect liquidified soil properties. ・Proposal of property estimation methods for liquidified soil based on results of ground inspection.

Fig-1 shows proportion of each answer.

In the evaluation items "Research results (degree of goal attainment)", "Presentation of results" and "Effort towards distribution of results", the highest evaluation grades are "Goals attained", "Appropriate" and "Appropriate" respectively. Apart from "Effort towards distribution of results", the highest evaluation exceeds 60%, which implies high evaluation overall. When the highest and the second highest evaluation grades are combined, including those of "Effort towards distribution of results", the proportion reaches 90%. However, "Insufficient" for "Effort towards distribution of results" accounts for 40% of the total evaluation. Regarding distribution of results, post research activities are also important and should be reinforced.

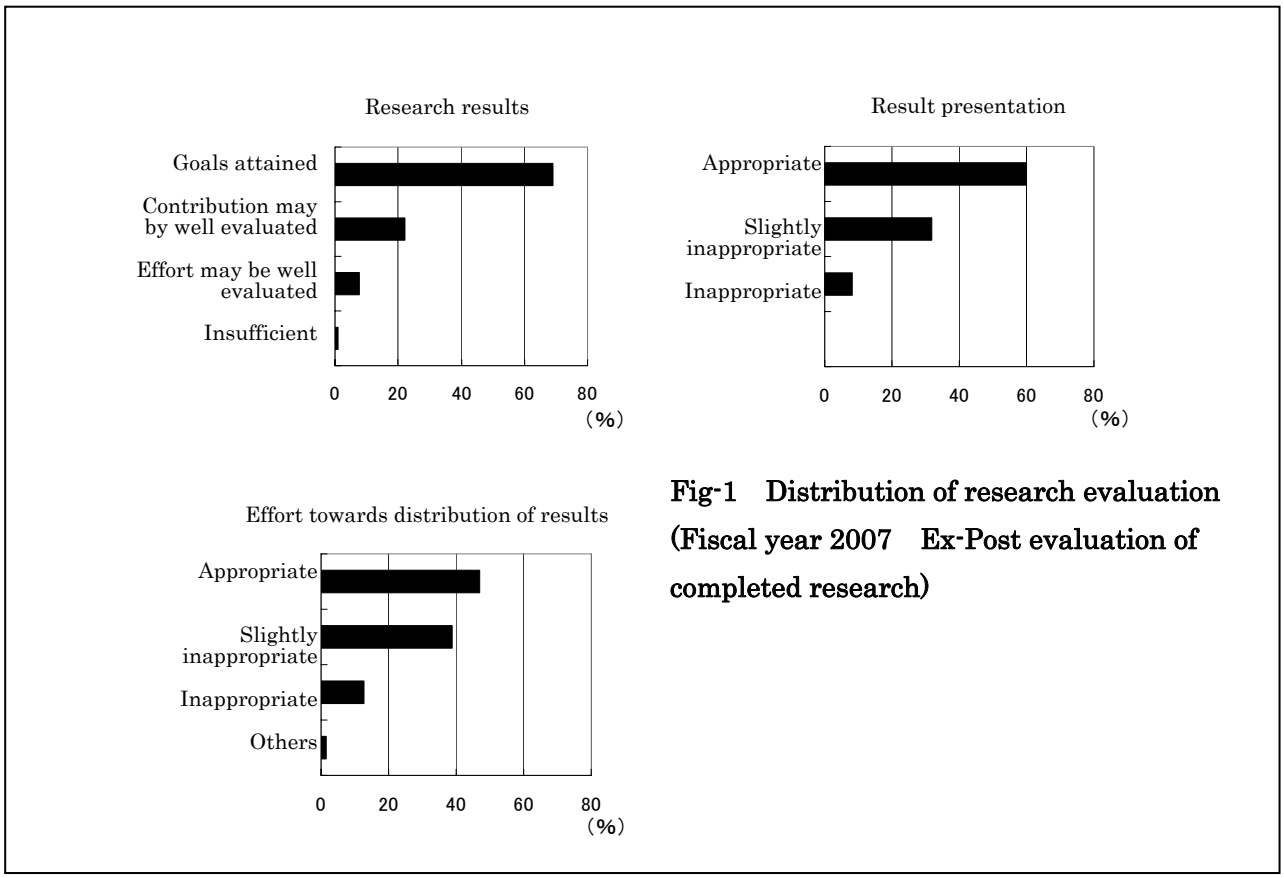


Fig-1 Distribution of research evaluation (Fiscal year 2007 Ex-Post evaluation of completed research)

Fig-2 shows interrelation between the most common opinions, remarks and number of relevant themes.

Relatively more comments were related to continuation/ development of research while relatively fewer comments were on cooperative research with other institutions. There were more comments about presentation and distribution of the research results than ones about the research results themselves, and effort for future distribution of results including paper presentation, application of research results to actual construction sites, reflection in standards, etc, is needed for many of the research themes, which is consistent with the previous evaluation result.

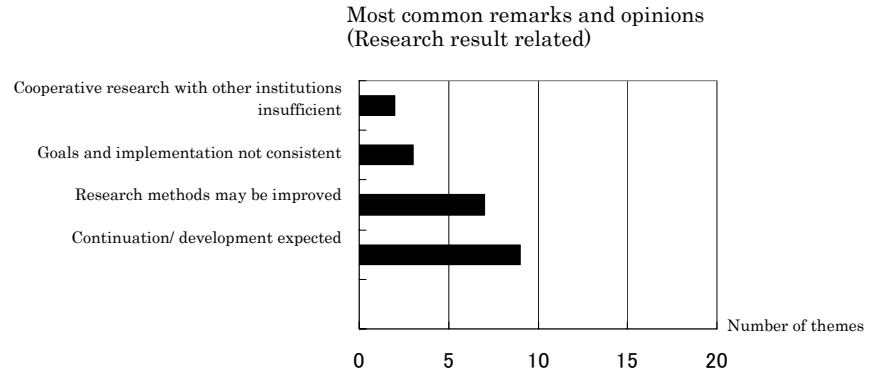
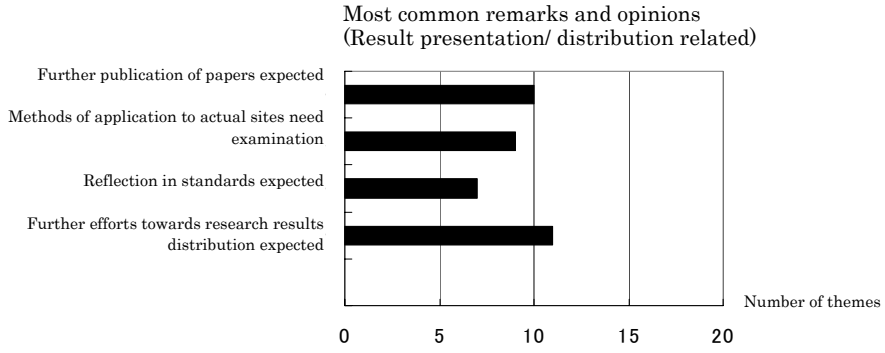


Fig-2 Most common remarks and opinions
(Fiscal year 2007 Ex-Post evaluation of completed research)



Among the themes which had been evaluated, six themes and one theme were evaluated by two thirds or more of the evaluation committee members as “Goals attained” or “Appropriate” respectively for all the evaluation items; “Research results”, “Research presentation” and “Efforts towards research result distribution”. Apart from those, one strategic research theme, nine general research themes and two budding research themes were evaluated as “Goals attained” by two thirds or more of the evaluation committee members. Those results are shown in Table-3.

Table- 3 Highly evaluated themes

1) Themes which are evaluated by 2/3 or more of the evaluation committee members as "Goals attained" or "Appropriate" for all "Research results", "Result presentation" and "Efforts towards research result distribution".

General research (6 themes)	
1: Research on machine interface in remote operation of machines. 2: Building database on salt damage of concrete structures and utilizing it for rationalization of maintenance & management. 3: Development of iron reinforcing bar- humus soil research methods for concrete structures.	4: Research on support force properties of shallow foundations that comes under load in earthquakes. 5: Research on quick estimation methods for cut slope landslide scale by high precision surface displacement measurement. 6: Experimental research on anti-seismic design methods for retaining walls that take critical conditions into consideration.
Budding research (1 theme)	
1: Basic research on environmental conditions where concrete structures are placed	

2) Themes other than the ones evaluated by 2/3 or more of the evaluation committee members as "Goals attained" as shown in 1).

Strategic theme (1 theme)	
1: Research on internal defects in welded parts of steel bridges.	
General theme (9 themes)	
1: Development of database for hydraulic/ hydrologic model evaluation 2: Research on advanced tunnel maintenance and management methods. 3: Research on rationalization of tunnel supporting structures. 4: Research on performance evaluation for pumping stations using CFD.	5: Research on evaluation methods for river environment recovery at the basin level. 6: Research on steel/ concrete joint structures. 7: Research on design methods for discharge facilities for flood control of dams made specific for water management. 8: Development of 3D input simulation methods for seismic behavior of reinforced concrete structures. 9: Experimental research on anti-seismic design methods for road piers using high performance materials.

Budding research (2 themes)	
1: Basic research on environmental stress detection technology using genetic analysis methods.	2: Research on property evaluation of liquidified soil for anti-seismic design.

3.2 Ex-Post evaluation ② (The 2nd Internal Evaluation Committee)

No themes were had Ex-Post evaluation in the 2nd Internal Evaluation Committee.

4. Mid-stage evaluation

Interim evaluation was carried out on

① themes started in fiscal year 2005 and will be continued in fiscal year 2008 and onward.

② themes continued in fiscal year 2008 and onward whose research plan will be changed

③ themes continued in fiscal year 2008 and onward whose research implementation plan will be changed due to the transfer of project related to technological development, etc, from Hokkaido Regional Development Bureau as decided by the Cabinet in June, 2006.

One answer was chosen from the choices in Table-4 regarding "Degree of progress", "Result presentation" and "Necessity of continuation of research" (including changes in the plan).

Table-4 Interim evaluation and choices ①

Items	Choices
Degree of progress	1) Fast 2) As planned 3) Slightly slow 4) Slow
Result presentation	1) Appropriate 2) Slightly insufficient 3) Insufficient
Total evaluation (Continuation of the research)	1) Research to be continued as initially planned. 2) Implementation plan to be changed and research to be continued as proposed. 3) Research plan to be revised and research to be continued the remarks on the right into consideration. 4) Research plan to be reviewed and re-deliberated taking the remarks on the right into consideration.

	5) Research to be halted due to the remarks on the right.

4. 1 Interim evaluation results ① (The 1st Internal Evaluation Committee)

Fifteen Interim evaluation themes as shown in Table-5 were evaluated at the 1st Internal Evaluation Committee. There were three Priority research projects themes, two strategic research themes, nine general research themes and one budding research theme.

Table -5 Interim evaluation themes ①

Research category	Theme	Period	Reason for Interim evaluation
Priority	14.1 Research on reducing environmental load on water management dams to minimum.	2006 ~ 2008	② Theme continued in fiscal year 2008 and its plan changed.
Priority	12.6 Research on technology to turn biomass of public enterprise origin into resource and to utilize it.	2006 ~ 2008	② Theme continued in fiscal year 2008 and its plan changed.
Priority	8.3 Research on increase/ decrease of pathogenic micro organism in water environment.	2006 ~ 2010	② Theme continued in fiscal year 2008 and its plan changed.
Strategic	Research on fatigue design methods for steel decks.	2006 ~ 2008	② Theme continued in fiscal year 2008 and its plan changed.
Strategic	Research on automatic controlling technology for hydraulic shovels.	2006 ~ 2009	② Theme continued in fiscal year 2008 and its plan changed.
General	Research on applicability of tunnels without cover work.	2005 ~ 2008	① The theme started in 2005 and continued in 2008 onward.
General	Research on systemization of excavation structure design.	2005 ~ 2008	① The theme started in 2005 and continued in 2008 onward.
General	Advanced soil structure management using sensor technologies.	2005 ~ 2008	① The theme started in 2005 and continued in 2008 onward.
General	Research on rational design methods for the core width of cock fill valve dams.	2005 ~ 2008	① The theme started in 2005 and continued in 2008 onward.
General	Research on the water hazard database.	2005 ~ 2008	① The theme started in 2005 and continued in 2008 onward.
General	Research on development of landslide damage evaluation technology.	2005 ~ 2008	① The theme started in 2005 and continued in 2008 onward.
General	Research on deformation amount of	2005 ~	① The theme started in 2005 and

	reinforced soil walls in earthquakes.	2008	continued in 2008 onward.
General	Experimental research on rationalization of anti-seismic design methods for bridge foundations to deal with liquidization.	2005 ~ 2008	① The theme started in 2005 and continued in 2008 onward.
General	Basic research on anti-seismic design that takes into consideration the dynamic interrelation between ground and structures.	2005 ~ 2008	① The theme started in 2005 and continued in 2008 onward.
Budding	Technology for maintenance and management of regional non-heavy traffic roads.	2006 ~ 2008	② The theme continued in fiscal year 2008 and its plan changed.

As a result, concerning "Necessity of continuation of the research", all the themes were evaluated as needing to be continued as in the proposed plans. Therefore, those themes shall be implemented as planned in the proposals. The proportions of each answer concerning "Degree of progress" and "Result presentation" are all shown in Fig-3. "Fast" and "As planned" altogether account for slightly less than 80% in "Degree of progress" and "Appropriate" in "Result presentation" slightly less than 60%.

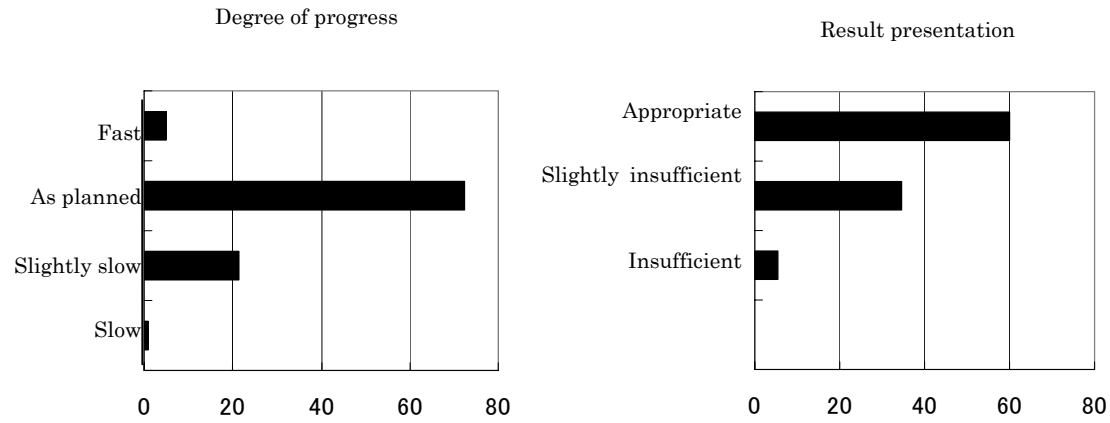


Fig-3 Distribution of evaluation on "Degree of progress" and "Result presentation" ①
(Interim evaluation themes)

4. 2 Interim evaluation results ② (The 2nd Evaluation Committee meeting)

Forty six themes evaluated in the 2nd Evaluation Committee meeting are shown in Table-6, where seven important project research general themes, twenty-two priority research projects

individual themes, one strategic theme and sixteen general themes are included.

Table-6 Interim evaluation themes ②

Research category	Theme	Period	Reason for mid-stage evaluation
Priority	16: Development of a local biomass recycling system that mainly uses shared biogas plants.	2006 ~ 2010	③ The theme continued in 2008 and its research implementation plan changed due to the transfer of technological development related projects from Hokkaido Regional Development Bureau as decided by the Cabinet in June, 2006.
Priority	16.1: Development of technology to turn biomass into fertilizer / energy and investigation on its efficient transport methods.	2006 ~ 2010	Same as above.
Priority	17: Research on improvement on the water supply functions of agricultural water supply facilities in snow piling cold region and preservation of their structure and functions	2006 ~ 2010	Same as above.
Priority	17.2: Development of technology for stability and durability of structures/ functions of agricultural water supply facilities.	2006 ~ 2010	Same as above.
Priority	17.3: Research on technology for repair/ restoration planning of agricultural water supply facilities.	2006 ~ 2010	Same as above.
Priority	15. Development of design technology for basin and river tracks that forms a part of the environment around cold region rivers.	2006 ~ 2010	Same as above.
Priority	15.1 Development of methods for creation and maintenance of the river environment rich in diversity by restoration of winds, etc.	2006 ~ 2010	Same as above.
Priority	15.2: Development of desirable river track design technology for natural reproduction of cold water fishes.	2006 ~ 2010	Same as above.
Priority	15/3: Development of methods of investigation on the salt intrusion phenomenon at the freezing point and of flow amount observation.	2006 ~ 2010	Same as above.
Priority	15.4: Research on technology to	2006 ~	② The theme continued in fiscal

	control environmental load leakage from large scale farming areas into rivers.	2010	year 2008 and its plan changed. ③ The theme continued in 2008 and its research implementation plan changed due to the transfer of technological development related projects from Hokkaido Regional Development Bureau as decided by the Cabinet in June, 2006.
Priority	5: Advanced use of the seaside areas in cold regions.	2006 ~ 2010	③ The theme continued in 2008 and its research implementation plan changed due to the transfer of technological development related projects from Hokkaido Regional Development Bureau as decided by the Cabinet in June, 2006.
Priority	5.1 Research on improvement on the environment around the seaside facilities in cold regions.	2006 ~ 2010	Same as above.
Priority	5.2 Research on characteristics of the way drift ice emerges and its effect on structures, etc.	2006 ~ 2010	Same as above.
Priority	5.3 Improvement of the functions of aquatic organism's habitat in port areas in cold regions and water environment preservation technology.	2006 ~ 2010	Same as above.
Priority	7: Research on improvement on safety/ efficiency of winter roads.	2006 ~ 2010	Same as above.
Priority	7.1 Research on winter road management.	2006 ~ 2010	Same as above.
Priority	7.2 Research on measures against road accidents in cold regions	2006 ~ 2010	Same as above.
Priority	7.3: Research on performance evaluation for snow disaster prevention facilities.	2006 ~ 2010	Same as above.
Priority	7.4: Research on visibility obstruction by snow blizzard	2006 ~ 2010	Same as above.
Priority	6: Research on improvement of road disaster prevention standards to deal with large scale rock slope collapse, etc	2006 ~ 2010	Same as above.
Priority	6.1 Research on more advanced evaluation and inspection of bedrock/ slope collapse	2006 ~ 2010	Same as above.
Priority	6.2 Research on more rational and	2006 ~	Same as above.

	advanced disaster preventive road works.	2010	
Priority	11: Research on public works facilities' durability in cold regions	2006 ~ 2010	Same as above.
Priority	11.1 Research on optimization of works to deal with peaty soft ground	2006 ~ 2010	Same as above.
Priority	11.2: Research on behavior of complex decay by frost/ salt damage and its evaluation.	2006 ~ 2010	Same as above.
Priority	11.3 Research on improvement of concrete durability in snow piling cold regions.	2006 ~ 2010	Same as above.
Priority	11.4 Research on improvement of load durability of structures in snow piling cold regions taking decline of performance into account.	2006 ~ 2010	Same as above.
Priority	11.5 Research on measures against pavement decay in cold regions.	2006 ~ 2010	Same as above.
Priority	11.6 Research on public works facility management methods in snow piling cold region.	2006 ~ 2010	Same as above.
Strategic	Research on snow avalanche risk assessment methods for heavy snow fall.	2006 ~ 2010	Same as above.
General	Research on interrelation between substances with snow melting capability and their outflow mechanism.	2006 ~ 2010	Same as above.
General	Research on the rolls and pitches of moored small boats.	2006 ~ 2010	Same as above.
General	Research on measures against waves overtopping seaside facilities.	2006 ~ 2010	Same as above.
General	Research on preservation of seaside areas around a large river mouth in snow piling regions.	2006 ~ 2010	Same as above.
General	Research on road structures/ road& traffic management suitable for Hokkaido.	2006 ~ 2010	Same as above.
General	Research on rational evaluation methods to deal with freezing and frost heave of rock road beds.	2006 ~ 2010	Same as above.
General	Research on a more advanced evaluation system for tunnel grounds in Hokkaido.	2006 ~ 2010	Same as above.
General	Research on performance evaluation design of road appurtenances in Hokkaido.	2006 ~ 2010	Same as above.
General	Research on evaluation of anti-seismic performance of structures that takes into	2006 ~ 2010	Same as above.

	consideration the properties of earthquake motions in Hokkaido.		
General	Research on anti-seismic reinforcement technology for embankments on peaty soft ground.	2006 ~ 2010	Same as above.
General	Research on design methods for foundation structures on special ground in Hokkaido.	2006 ~ 2010	Same as above.
General	Research on effects of anti-freeze agent on steel bridge paint.	2006 ~ 2010	Same as above.
General	Research on effects of anti-freeze agent on weather resistant steel materials.	2006 ~ 2010	Same as above.
General	Research on recycled aggregate concrete in snow piling cold region.	2006 ~ 2010	Same as above.
General	Research on application of porous concrete to snow piling cold regions.	2006 ~ 2010	Same as above.
General	Research on pavement quality management methods in snow piling cold regions.	2006 ~ 2010	Same as above.

In the Interim evaluation, “Necessity of continuation of the research”, one of the evaluation items, was particularly evaluated by the choices in Table-7 due to the special reason in ③. Based on the results, all the themes shall have their implementation plans revised and continued. It have been decided, among the forty-six themes for evaluation, fourteen themes, about 30% of all the themes, have their implementation plans revised based on the remarks by the committee members. “15.4 Research on technology to control environmental load leakage from large scale farming areas into rivers”, had Interim evaluation in the first meeting due to the changes to the annual plan and in the third meeting due to the change of contents caused by the transfer of technology development related projects from Hokkaido Regional Development Bureau. This theme only applies to ① and was evaluated as in Table-4.

Table-7 Interim evaluation items and the choices ②

Items	Choices
Total evaluation (Continuation of the research)	1) Research to be continued as initially planned. 2) Implementation plan to be changed and research to be continued as proposed. 3) Research plan to be revised and research to be continued the remarks on the right into consideration. 4) Research plan to be reviewed and re-deliberated taking the remarks on the right into consideration. 5) Research to be halted due to the remarks on the right.

5. Advance evaluation results

In the Advance evaluation, general themes and budding themes, after being evaluated on evaluation items, ① "Awareness on the social requirements/ social contribution", ② "Necessity of the public works research", ③ "Awareness on the meaning as research", ④ "Contents of the goals", ⑤ "Annual research plan", ⑥ "Research methods/ implementation system" and ⑦ "Purposes and more efficient use of the budget", are comprehensively evaluated on approvability. In strategic research, "Necessity as a strategic research theme" is added to ① ~ ②. The individual themes of the important project research are evaluated on "Awareness on the meaning in the important project research" instead of ③ and "Measures for distribution of research results" is added to the evaluation items. The evaluation items and the choices of each of those categories are shown in Table-8.

The research policy studies which started in fiscal year 2007 are, as a rule, run for a short period of time and with small budget. As they are for examining future direction of required research, evaluation regarding whether they accord with the purposes of the research policy studies was conducted.

Table-8 Advance evaluation items and the choices

General / Budding research items.	Strategic Research	Priority research projects
Awareness on the social requirements (outcomes). 1) Appropriate 2) Partly inappropriate 3) Inappropriate	Same as left.	Same as the left.
Necessity of the public works research.	Same as the left.	Same as the left.

1) Appropriate 2) Partly inappropriate 3) Inappropriate		
	Necessity as a strategic research theme. 1) Appropriate 2) Inappropriate	Awareness on the meaning in the Priority research projects. 1) Appropriate 2) Partly inappropriate 3) Inappropriate
Awareness on the meaning as research. 1) Appropriate 2) Partly inappropriate 3) Inappropriate	Same as the left.	Same as the left.
Contents of the goals (results, outcomes) 1) Concrete and appropriate. 2) Partly abstract or inappropriate. 3) The whole plan needs revision.	Sam as the left.	Sam as the left.
Research annual plan 1) Appropriate 2) Partly needs review 3) The whole plan needs revision.	Sam as the left.	Sam as the left.
Research methods/ implementation system 1) Appropriate 2) Partly needs review 3) The whole plan needs revision.	Sam as the left.	Sam as the left.
Purposes and more efficient use of the budget. 1) Appropriate 2) Partly needs review 3) The whole plan needs revision. 4) Lacking grounds for judgment.	Sam as the left.	Sam as the left.
Total evaluation	Sam as the left.	Total evaluation

1) Implement according to the implementation plan. 2) Implement after revision of the implementation plan according to the remarks 3) Research cancelled. The research categories 1) need no change 2) need change ① Strategic research ② General research ③ Budding research		As an individual theme of Priority research projects 1) Appropriate ①Implement according to the implementation plan. ②Implement after revision of the implementation plan according to the remarks 2) Inappropriate ① Strategic research ② General research ③ Budding research ④ Cancel

At Tsukuba and ICHARM, the themes decided to implement according to the evaluation total thirty one themes (and 32 themes including one research policy study); four Priority research projects themes, eleven strategic themes, fifteen general themes, one budding theme. More details are described from the next section. On the other hand at Civil Engineering Research Institute, total of twenty-seven themes (and thirty- three themes including six research policy study).

Also among the important project research individual themes which had advance evaluation, seven themes (two themes at the first Internal Evaluation Committee meeting, five themes at the second Internal Evaluation Committee meeting) will be further evaluated by External Evaluation Committee based on the report of the committee (the two themes evaluated at the first meeting have been evaluated by External Evaluation Committee).

5.1 Advance evaluation results ① (The first Internal Evaluation Committee meeting)

The themes which had advance evaluation at the first and the second Internal Evaluation Committee meetings except for research policy studies, after the evaluation, further had their proposals examined and categorized into "① Theme to be implemented according to the implementation plan", "② Theme that needs change before implementation" and "③ Theme to be cancelled". The forty-five advance evaluation themes (five priority, fifteen strategic, twenty-four general and one budding) categorized into ① ~ ③ are twenty-five themes (four priority, nine strategic, twelve general), six themes (two strategic, three general, one budding) and fourteen themes (one priority, four strategic, nine general) respectively. Among "③ Theme to be cancelled", four themes had remarks at the first meeting, had its implementation plan changed significantly, had pre-stage evaluation at the second meeting and was turned to "① Theme to be implemented according to the implementation plan".

Table-9 shows the themes to be implemented in fiscal year 2008 and their goals. The changes of ones to be implemented after change of their contents are shown in the table.

Table-9 Themes to be newly implemented in fiscal year 2008 (excluding research policy studies) ①

Number	Research category	Theme	Goals	Change to the contents
1	Priority	Research on evaluation methods for sinkage amount of fill dams at large scale earthquakes.	・Proposal on evaluation methods for sinkage amount of fill dams at large scale earthquakes.	-
2	Priority	Research on risk evaluation of reactivated landslide areas in earthquakes.	・Methods to prepare reactivated landslide risk spot maps for the tertiary formation areas. ・Trial preparation of reactivated landslide risk spot maps for the model areas, such as Joetsu district. ・Proposal of a basic information management system concerning information on factors needed for risk spot prediction for reactivated landslide caused by earthquakes.	-
3	Priority	Research on building of a knowledge database concerning incidents of road bridge diagnosis and measures.	・Definitions of terms ・Preparation of knowledge database. ・Follow-up research on the effect of the measures. ・Specification of data items necessary for high grade diagnosis.	-
4	Priority	Research on use of satellite data for water hazard risk evaluation.	・Verification of accuracy in topographical reconstruction. ・Development of topographical data process methods best suited to flooding related calculation. ・Preparation of water hazard risk evaluation guidelines combined with flooding related calculation for flood outflow, etc.	-
5	General	Research on physical	・Investigation on physical behavior of	-

		properties of discontinuous bedrock for dam foundations under tension in large earthquakes.	discontinuous bedrock under tension. ・Proposal of physical models of discontinuous bedrock under tension for concrete dam anti-seismic capacity evaluation.	
6	General	Research on environmental safety evaluation of substance dissolved out from recycled aggregates.	・Factual investigation on hazardous substance dissolved out from recycled aggregates. ・Proposal of dissolution test methods. ・Proposal of evaluation methods for dissolution test results.	-
7	General	Research on risk assessment for tunnel safety evaluation.	・Proposal of risk assessment for tunnel safety evaluation methods.	-
8	General	Research on the properties and the behavior of organic substances generated by algae in lakes and ponds.	・Establishment of analysis methods for organic substances generated by algae in lakes and ponds. ・Investigation on the behavior of organic substances generated by algae in lakes and ponds.	-
9	General	Research on soundness assessment methods for reinforced soil structures.	・Proposal of soundness assessment methods such as reinforced material pull out test standards in reinforced soil work methods. ・Proposal of damage assessment standards and repair standards for reinforced soil work methods.	-
10	General	Research on permeability evaluation of unsaturated ground in saturated state.	・Proposal of permeability evaluation methods for unsaturated ground in saturated state.	-
11	General	Experimental research on capacity evaluation methods for bearing/ unseating prevention system of road bridges.	・Investigation on durability/ deformation properties of bearing/ unseating prevention system. ・Setting methods for strength against earthquake motion/ ground displacement to be assumed in bridge unseating prevention design.	-

12	Strategic	Research on quantitative soundness evaluation methods for the existing tunnels.	・Proposal of quantitative soundness evaluation methods.	-
13	Strategic	Experimental research on anti-seismic bridge design methods using seismic control mechanism.	・Investigation on behavior of bridge structures with dampers in earthquakes. ・Proposal of capacity evaluation and analysis models of dampers. ・Proposal of critical state setting methods and performance verification methods for bridges using dampers.	-
14	strategic	Research on anti-seismic capacity of complex foundations integrated with improved ground.	・Investigation on load duration mechanism of complex foundations. ・Proposal of verification methods for anti-seismic capacity of complex foundations.	-
15	General	Research on appropriate maintenance management of underground water discharge facilities in landslide areas.	・Identification of facts and problems of reduced functions of drainage pipes and measures against it. ・Investigation of factors for reduced functions in typical examples and evaluation of function maintenance measures. ・Proposal of efficient and safe underground discharge facility inspection methods.	-
16	Strategic	Research on partial coefficient design methods for deep foundations.	・Proposal of partial coefficient design methods for road bridge sub structures.	-
17	Strategic	Research on segment design that takes construction load into consideration (At the evaluation: Research on segment design that excels in	・Proposal of construction load evaluation methods. ・Proposal of a segment design method that takes construction load into consideration.	The research theme name has been changed based on some remarks.

		long-term durability)		
18	General	Research study on suspended substances flowing out in floods from the viewpoint of residue study.	・ Establishment of particle-size analysis of fine particle suspended substances. ・Investigation of dynamism of fine particle suspended substances in basin/ dam reservoir areas.	-
19	Budding	Basic research on estimation methods for rock and earth avalanche forms (At the evaluation: Basic research on rock and earth avalanche measures based on a new form categorization.	・ Preparation of rock and earth avalanche instance database. ・Proposal of rock and earth avalanche form estimation methods based on the database above.	The research theme name has been changed based on some remarks.
20	Strategy	Development of new anti-seismic design systems fro structure foundations.	・ Preparation of proposal of anti-seismic design methods for structure foundation using dynamic analysis (gist and calculation examples). ・Clarification of applicability of the current design system.	The research period, the research scope and the goals have been changed based on.
21	General	Research on evaluation of life cycle cost for landslide measures and asset management (At the evaluation: Research on evaluation of life cycle cost for landslide measures in dam projects and asset management)	・Guidelines regarding life cycle cost for landslide measures. ・ Guidelines regarding asset management in landslide measures.	The theme name, the necessity, the research scope, the implementation system and the annual plan have been changed based on some remarks.
22	General	Research on ventilation control methods which take natural/ traffic	Development of ventilation control systems which take natural/ traffic conditions into consideration.	

		conditions into consideration.		
23	General	Research on concrete durability evaluation by non-destructive/ mini-destructive tests.	Proposal of evaluation methods for physical properties of concrete using non-destructive/ mini destructive. Proposal of evaluation methods for steel protection capacity of concrete using non-destructive/ mini destructive.	The theme was adopted in the first Internal Evaluation Committee meeting but had evaluation at the second meeting after its implementation plan had been revised.
24	Strategic	Research on improvement of noise prediction technology concerning road works.	Establishment of noise prediction methods with a higher sound receiving point (prevention measures evaluation methods). Preparation of noise measurement guidelines based on the methods above.	The scope of the research and the goals have been changed based on some remarks.
25	Strategic	Research on soundness evaluation of the existing concrete road bridges.	Proposal of the material strength and the material coefficients at the occurrence of damage. Proposal of concrete road bridge evaluation methods according to the state of damage.	-
26	Strategic	Research on state evaluation methods for prevention of fatal damage to the existing steel bridges.	Proposal for state evaluation methods mainly for truss bridges and arch bridges.	
27	Strategic	Research state evaluation technology based on material/ strength properties of old steel part	Proposal of state evaluation of damaged part materials. Proposal of fatigue durability evaluation methods for existing steel bridge part materials without	-

		materials.	anti-fatigue design.	
28	Strategic	Research on measures against abnormal sediment disasters caused by deep layer collapse.	Preparation of landslide prevention basic planning guidelines (abnormal sediment disasters of natural dams, etc).	The theme was disapproved at the first Internal Evaluation Committee meeting but had its implementation plan revised and had the evaluation.
29	Strategic	Research on inspection technology for important structural parts of road bridges which are hard to identify.	Proposal of non-destructive inspection/ research methods for road bridge damages/ defects which are hard to identify. Proposal of state monitoring technology from damage detection to implementation of measures.	-
30	General	Research on road surface design methods which take interrelation between road surface properties and automobile drivability.	Development of measurement methods for rolling resistance. Development of texture measurement methods which take tire/ road surface noise and slip resistance into consideration. Establishment of road surface design methods which take vehicle drivability into consideration.	The theme was disapproved at the first Internal Evaluation Committee meeting but had its implementation plan revised and had the evaluation.
31	General	Experimental research on fish the ladder functions.	Establishment of flow evaluation technology for fish ladders and surrounding facilities based on fish-swimming behavior.	The implementation system, the goals and the

			Proposal of design methods for fish ladders and surrounding facilities based on fish-swimming behavior.	annual plan have been changed based on some remarks.

Concerning the research policy studies, it was decided, after examining the approve/disapprove evaluation result and applicability, one of the two relevant themes shall be implemented. Table-10 shows the list of the implemented theme.

Table-10 Fiscal year 2008 Research policy study implemented theme ①

Number	Research theme	Main remarks
1	Study on IT/ RT distribution policy in public enterprises	Broad utilization should be examined by linking with other teams.

5.2 Advance evaluation results ② (The 2nd Internal Evaluation Committee meeting)

Concerning the Advance evaluation themes other than the research policy study evaluated in the 2nd Internal Evaluation Committee meeting, after they had been evaluated as detailed above, the contents of the proposal were further examined and the total of twenty-seven themes were chosen as "① Theme to be implemented according to the implementation plan". Among the twenty-eight themes (five priority, six strategic and one general), twenty-seven themes (five priority, six strategic and sixteen general) were categorized as group① (The proposal of one general theme as a new theme was withdrawn and it was incorporated into the goals of the important project individual themes based on some remarks). It was decided that the implementation plans of 19 themes among the twenty-seven themes to be evaluated, about 70% of all the themes, shall be amended based on the remarks by the committee members.

Table-11 shows the themes to be implemented in 2008 and their goals. The contents of changes for the ones which are implanted after content change are also shown in the table.

Table- 11 Fiscal year 2008 Themes to be implemented (excluding research policy study) ②

Number	Research category	Theme	Goals	Contents of changes
1	Priority	Investigation on production environment improvement effects of slurry irrigation.	Investigation on production environment improvement effects (easier sewage disposal treatment, improvement of soil, produce amount, quality improvement, etc) of aerobic process systems. environmental load substance Investigation on the balance of	The necessity, the scope of the research, the implementation system, the goals and the annual plan have been

			aerobic-irrigated soil.	changed.
2	Priority	15.5: Investigation on river track formation and research on its application to bridge blockage by driftwood.	Development of river track structure management methods such as driftwood pile prevention measures and examination of development and applicability of riverside tree management methods for reduction of driftwood which take the conditions of the location of riverside trees into consideration, including prevention of riverside tree loss in floods and driftwood capture by riverside trees. Development of technology to identify topographic forms based on properties of gorge bottoms and plains and potential water hazard risk based on topographic origin.	
3	Priority	5.4: Development of technology related to underwater structure inspection technique to deal with freezing ports	Development of diagnostic equipments for decay of parts of port structures submerged in water. Development of inspection equipments for steel sheet pile walls. Development of simple sediment measurement equipments.	The annual plan has been changed based on some remarks.
4		7.5: Research on reduction of anti-freeze agent use (At the evaluation: Research on reduction of anti-freeze agent use, etc)	Evaluation of the environmental load of anti-freeze agents and prevention methods. Development of low environmental load anti-freeze agent distribution methods. Development of ice/frost removal.	Research theme has been changed based on some remarks.
5	Priority	7.6: Development of technology for faster snow/ ice	Building information management system for example, for snowplows. Building of snow removal information provision system.	-

		disposal	Development of winter road snow pile measurement technology.	
6	Strategy	Research on technology for preservation of peat soil farm land that harmonize with the environment.	Investigation on the ground sinking mechanisms caused by peat decomposition or compression/ shrinkage and development of ground sinkage control technology with greenhouse gas control viewpoint. Development of rearrangement methods for farm roads and small scale drainage systems in peat soil farm land. Investigation on the environment load (water quality, greenhouse gas) reduction effect that accompanies underground water level control in peat soil farm land. Rearrangement methods for peat soil farm land that harmonizes with the surrounding environment. Development of technology to preserve pear soil farmland with consideration for preservation of surrounding damp plains.	
7	Strategic	Research on reliability of drainage systems in large scale farming areas.	Investigation on factors of flooding damage in farming zones. Investigation on functions of flow dividing facilities.	-
8	Strategic	Research on reconstruction and maintenance of	Proposal of environment load substance evaluation methods for closed water areas with snow melt runoff.	-
9	Strategic	Effects river structures have on sediment transport in sediment management in	Investigation of flow and sediment behavior in dam reservoirs and development of numerical calculation models for them. Investigation on behavior of nutrient salt in dam reservoirs and effect of	The theme name has been changed based on some remarks.

		the whole basin area and measures against them (At the evaluation: Research on identification of water and sediment transport properties and development of technology for observation of the properties.)	dam discharge on the downstream. Development of calculation models for sediment behavior and nutrient salts in dam reservoirs and their downstream areas. Deciding proposals on work methods for dams with openings and measures to make slits on erosion control dams. Identification of changes of rivers during sediment transport caused by river structures such as ground sill works.	
10	Strategic	Research on the overflow/ collapse mechanism of embankments (At the evaluation: Investigation on the destruction mechanism of river embankments)	Develop measures against overflow/ collapse of embankments by reconstructing them three dimensionally with overflow analysis software. Accurate prediction of overflow amount from the embankments is thought to contribute to identification of overflow/ collapse of embankments and to technological improvement for proposing appropriate water management measures with software.	The theme name has been changed based on some remarks.
11	Strategic	Research on creation of beautiful and pleasant roadside environment in Hokkaido.	Building database on roadside landscapes in Hokkaido. Preparation of evaluation methods for roadside landscapes in Hokkaido. Preparation of guidelines for formation of roadside landscapes in Hokkaido. Identification of problems with touring environment in Hokkaido and methods to make it more pleasant. Preparation of roadside greenery design methods.	

12	General	Research on effects of agricultural based re-vegetation works in snow piling cold regions.	Investigation on facts of effects of re-vegetation (on soil environment, state of re-vegetation, biological phase, water environment, etc). Investigation on factors that may impede re-vegetation effects (soil, weather, work method). Proposal of effect evaluation methods for re-vegetation recovery work.	The necessity has been changed based on some remarks.
13	General	Research on long-term function diagnosis on under-drainages in special soil and its maintenance.	Investigation on facts of well-functioning under-drainages and malfunctioning under-drainages (number of years since their construction, change of hydrophobic materials over time, shapes of dug out part, plow layers, sediment in under-drainages, state of outlets, etc). Investigation on factors for deterioration of under-drainage functions. Proposal of methods of diagnosis for long-term maintenance of under-drainages. Proposal of long-term maintenance of under-drainage functions.	The budget has been changed based on some remarks.
14	General	Research on fish habitat improvement effects of development of agricultural water supply systems in Hokkaido.	Verification and improvement of agricultural water supply facility design methods with consideration for fish habitat/ intrusion.	-
15	General	Research on function maintenance of settling basin in farming areas with volcanic	Function evaluation of settling basins. Proposal of methods to decide settling basin capacity. Proposal of settling basin maintenance management improvement methods.	The implementation plan and the annual plan have been changed based

		ash distribution.		on some remarks.
16	General	Research on preservation of mire in cold regions.	Development of methods to control bamboo leaf vegetation (Sarobetsu mire) and Alnus woods (Kushiro mire), which have intruded into mire by keeping the underground water level and the river water level high.	The scope of research, the goals and the annual plan have been changed based on some remarks.
17	General	Research on measures against ice/snow accretion on road facilities.	Investigation on the state of ice/ snow accretion that causes disasters. Indication of parts which need measures against ice/ snow accretion. Proposal of evaluation methods of ice/ snow accretion. Proposal of simple ice/ snow accretion measures.	The necessity and the annual plan have been changed based on some remarks.
18	General	Analysis of effects of water inrush disaster during low temperature & snow piled time and examination on technology to deal with the disaster.	Faster water discharge tasks during low temperature & snow piled time and improvement on reliability of the tasks. Securing disaster recovery support systems in a wide area.	-
19	General	Examination related to reduction of environment load of construction works under low temperature (At the evaluation: Research and	Proposal of const reduction by effective use of potential natural energy, etc, in Hokkaido. Proposal on reduction of CO_2 emission by use of natural energy or energy saving technology in construction machines. Promotion of infrastructure development by taking initiatives in proposal of introduction of models.	The theme name has been changed based on some remarks.

		examination of environment load of construction works under low temperature.		
20	General	Examination of more efficient construction works technology in snow piling cold region.	Proposal on more efficient construction technology/ work methods in snow piling cold region.	-
21	General	Development for technology related to cost reduction of snow/ ice removal.	Proposal of maintenance/ snow removal integrated machine performance requirements (rotary snowplow – road cleaning car). Proposal of road cornice treatment work methods/ machine performance requirement. Proposal of maintenance/ snow removal integrated machines and multi functional machines.	
22	General	Research on design/ construction methods for bridges, etc, with new structural forms in snow piling cold regions (At the evaluation: Research on design/ construction methods for structures with	Verification of performance of steel/ concrete composite structures in snow piling cold regions. Proposal and improvement of design/ construction methods for such structures. Proposal of design/ construction methods for expansion joints in snow piling cold regions.	The necessity has been changed based on some remarks.

		new structural forms in snow piling cold regions).		
23	General	Research on decay properties of existing tunnels in snowy cold regions and measures against it (At the evaluation: Research on durability of existing tunnels in snow piling cold regions).	Proposal of decay evaluation methods in snowy cold regions. Proposal of repair/ reinforce work methods and preventive works with consideration for the situation of each sites in snowy cold regions.	The theme name has been changed based on some remarks.
24	General	Research on road slope structures durable against frost heave and freezing-melting (At the evaluation: Research on road slopes stability in cold regions).	Proposal of measures against frost heave and water discharge measures for road slopes in cold regions. Proposal on growing greenery on slopes suitable for cold regions. Proposal of slopes suitable for cold regions.	The theme name has been changed based on some remarks.
25	General	Research on frost damage/ decay repair of river concrete structures (At the evaluation: Research on frost damage/ decay repair of river	Proposal of appropriate application methods for the existing repair measures for river concrete structures which have had frost damage or have decayed.	The research theme name has been changed based on some remarks.

		structures).		
26	General	Research on improvement of durability of airport pavement in cold regions.	Proposal of durability improvement measures for airport pavement. Proposal of winter surface measures for airport pavement.	The annual plan has been changed based on some remarks.
27	General	Research on pavement technology for environment load reduction in snow piling cold regions.	Proposal of low noise pavement technology suitable for snow piling cold regions. Proposal on effective pavement materials for measures against frozen road surface.	The necessity has been changed based on some remarks.

The research policy studies had their appropriateness as research policy studies evaluated at the second meeting and as a result, it was decided that six themes out of the fourteen themes were implemented. The themes to be implemented are shown in Table-12.

Table-12 Fiscal year 2008 Research policy study themes to be implemented ②

Number	Theme	Main remarks concerning implementation
1	Research on feasibility of use of indigenous plants to acid soil vegetation work in snow piling cold regions.	The theme may be narrowed down from overall examination including slope protection in cold regions.
2	Basic research on improvement of marine organism productivity.	How about making contents that utilize knowledge on the upwelling of cold places. It will be good to start with broad research setting and then narrow down.
3	Research on development of performance evaluating technology for improvement of road performance in cold regions.	With efforts of asset management methods to maximize VFM in mind, it is necessary try not to confine the output within the Institute. It is essential to make research objects materialize more.
4	Research on structural change in snow/ ice disasters and preventive technologies.	There are quite a few common issues concerning weather factors to share with other industries. It will be beneficial to cooperate with relevant

		research teams. From a wide viewpoint including, snow damage, floods, water resource, utilization of water, vegetation, ecology, etc, how the research on global warming may be systematically worked on in a bog frame of weather change and cold regions should be discussed intensely.
5	Examination on evaluation of the ripple effect of peat soil farmland preservation.	It is necessary to identify the broad effect and reflect it in evaluation methods of related projects and project implementation methods. It is necessary to clarify difference from other similar research themes and to narrow down the approach of each research theme.
6	Research on creation of a pleasant touring environment from the viewpoint of the international road tourism.	The idea of tourism in the road work field is new. It needs to be examined in detail regarding what to be researched on. Would it be possible to cooperate with travel agencies, sightseeing companies and the Private Sector?